Electronic Services - Los Angeles
M10275X

INSTRUCTIONS

CLASS QA, QB, and QC *PYROTRON*® RECEIVERS
(A-C WHEATSTONE BRIDGE CIRCUIT)

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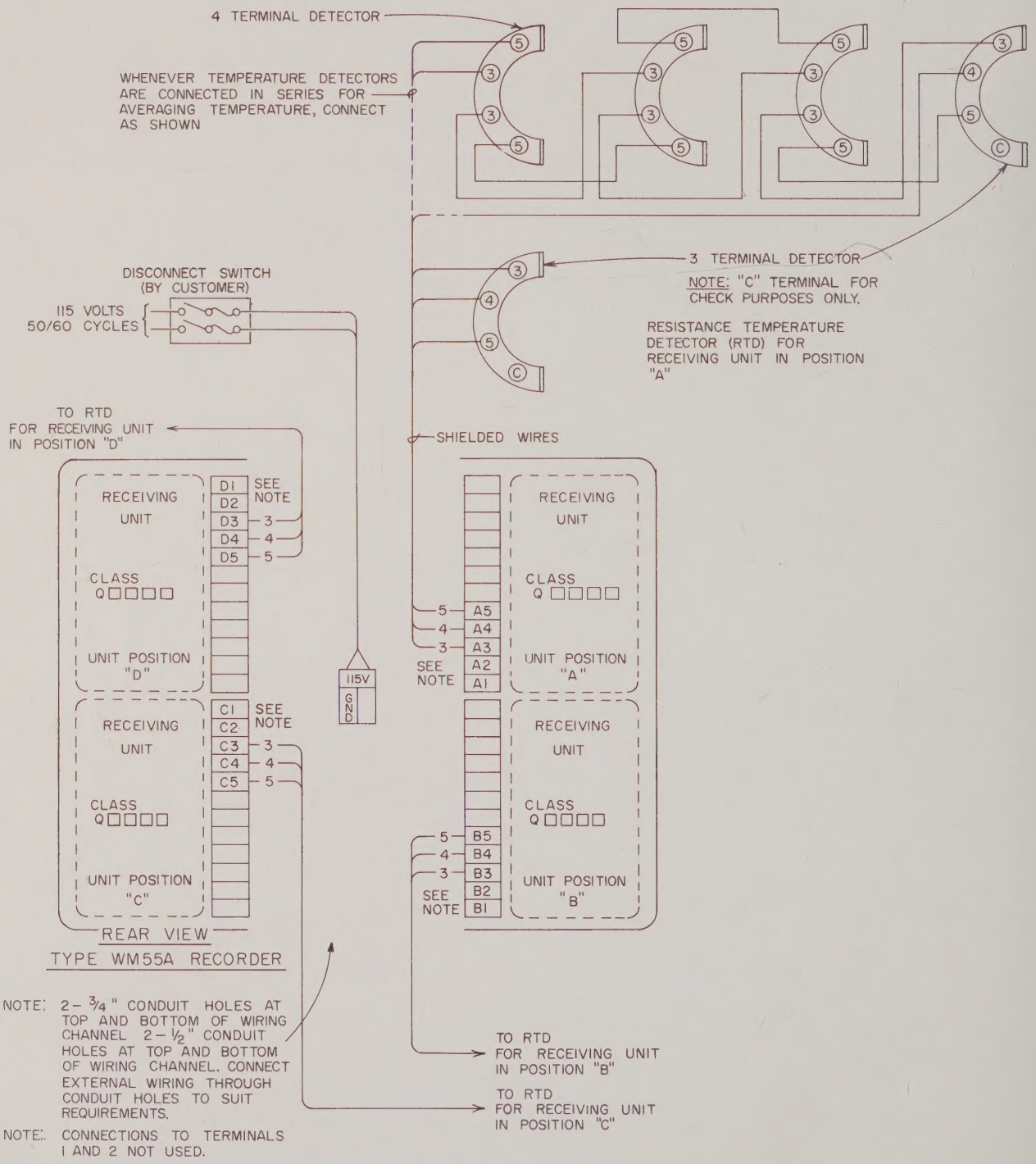
The Class QA, QB, or QC Pyrotron Receiver functions as a part of an A-C Wheatstone bridge circuit, which uses the highly accurate null-balance principle for measuring temperature. Platinum or nickel is employed as the temperature sensitive element. The Pyrotron Receiver converts electrical signals of a single temperature, average temperature, or temperature difference, to rotation of a cam. The cam positions a drive lever which may operate recording or indicating and control devices in a Type WM55 Recorder or Type WM53 Indicator.

CROSS-REFERENCES

Instrument or Equipment	Instruction Section
Type KM55 or WM55 Recorder and Type KM53 or WM53 Indicator	E12-3
Electronic Amplifier Unit, Part Nos. 666300-1, -2, and -3 (Vacuum Tube)	E12-37
Electronic Amplifier Unit, Part Nos. 6610434-1, and -2 (Transistorized)	E12-85
Electrical Receiver for Type WM55 Recorder or WM53 Indicator (Assembly and Components)	E12-42

BAILEY METER COMPANY • WICKLIFFE, OHIO 44092 FORM A2503-962



NOTE: 2 – 3/4" CONDUIT HOLES AT TOP AND BOTTOM OF WIRING CHANNEL 2 – 1/2" CONDUIT HOLES AT TOP AND BOTTOM OF WIRING CHANNEL. CONNECT EXTERNAL WIRING THROUGH CONDUIT HOLES TO SUIT REQUIREMENTS.

NOTE: CONNECTIONS TO TERMINALS 1 AND 2 NOT USED.

FIGURE 1 - External Connection Diagram for Class QA and QB Circuits with --B Design (32 ohm) or --C Design (10 ohm) Detectors

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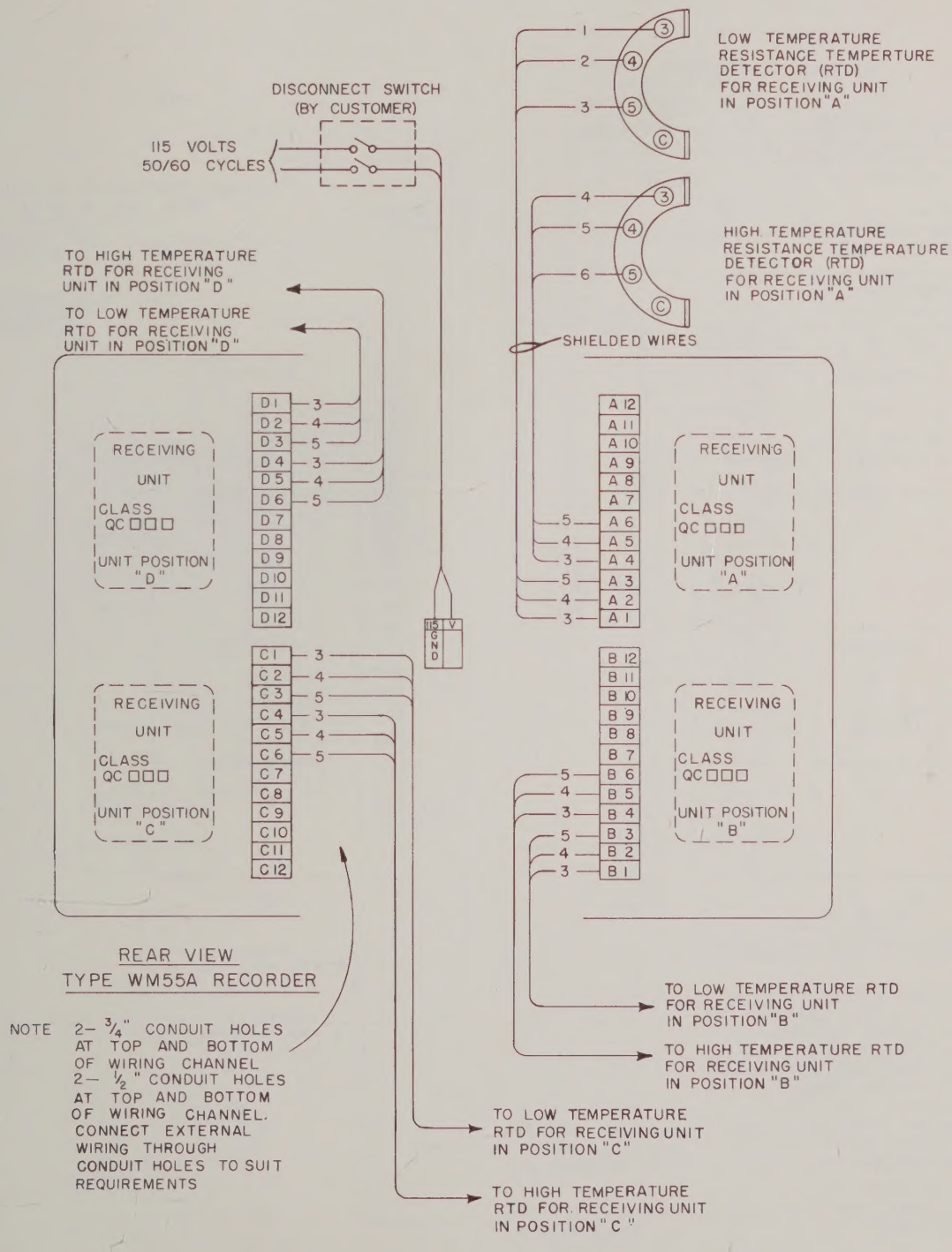


FIGURE 2 - External Connection Diagram for Class QC Circuits with --B Design (32 ohm) or --C Design (10 ohm) Detectors

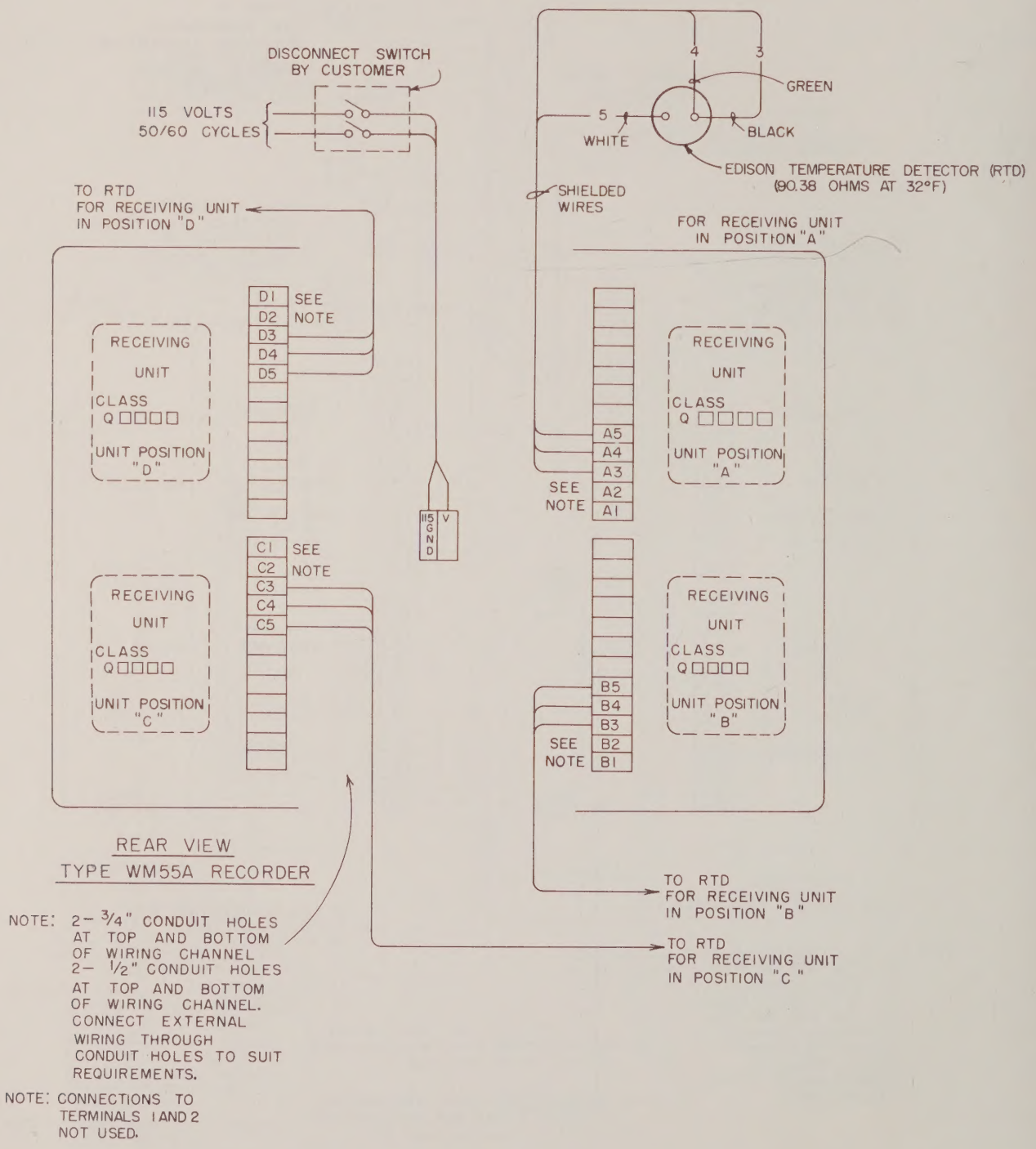


FIGURE 3 - External Connection Diagram for Class QA or QB Circuits with --E Design (90.38 ohm) Detectors

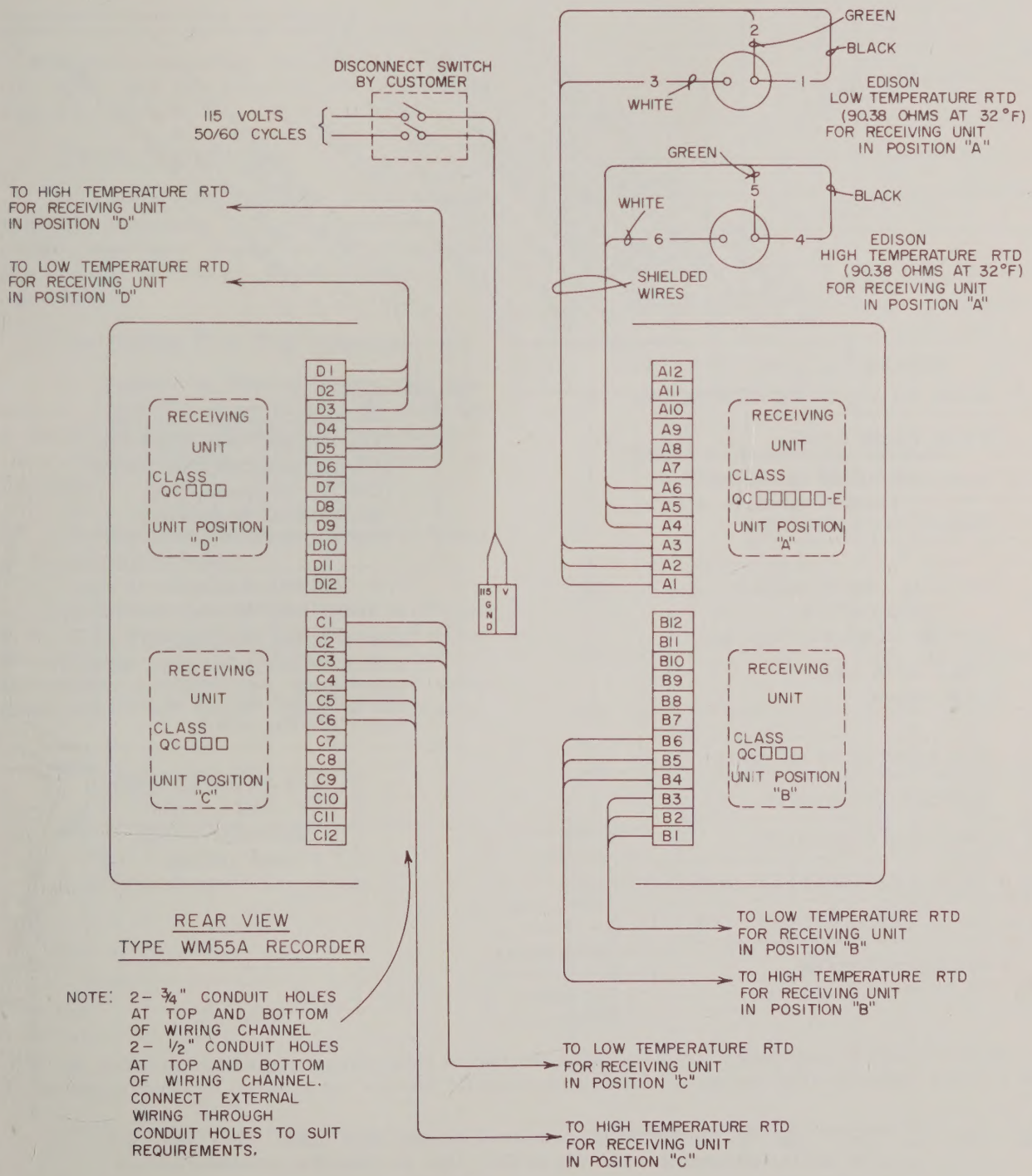
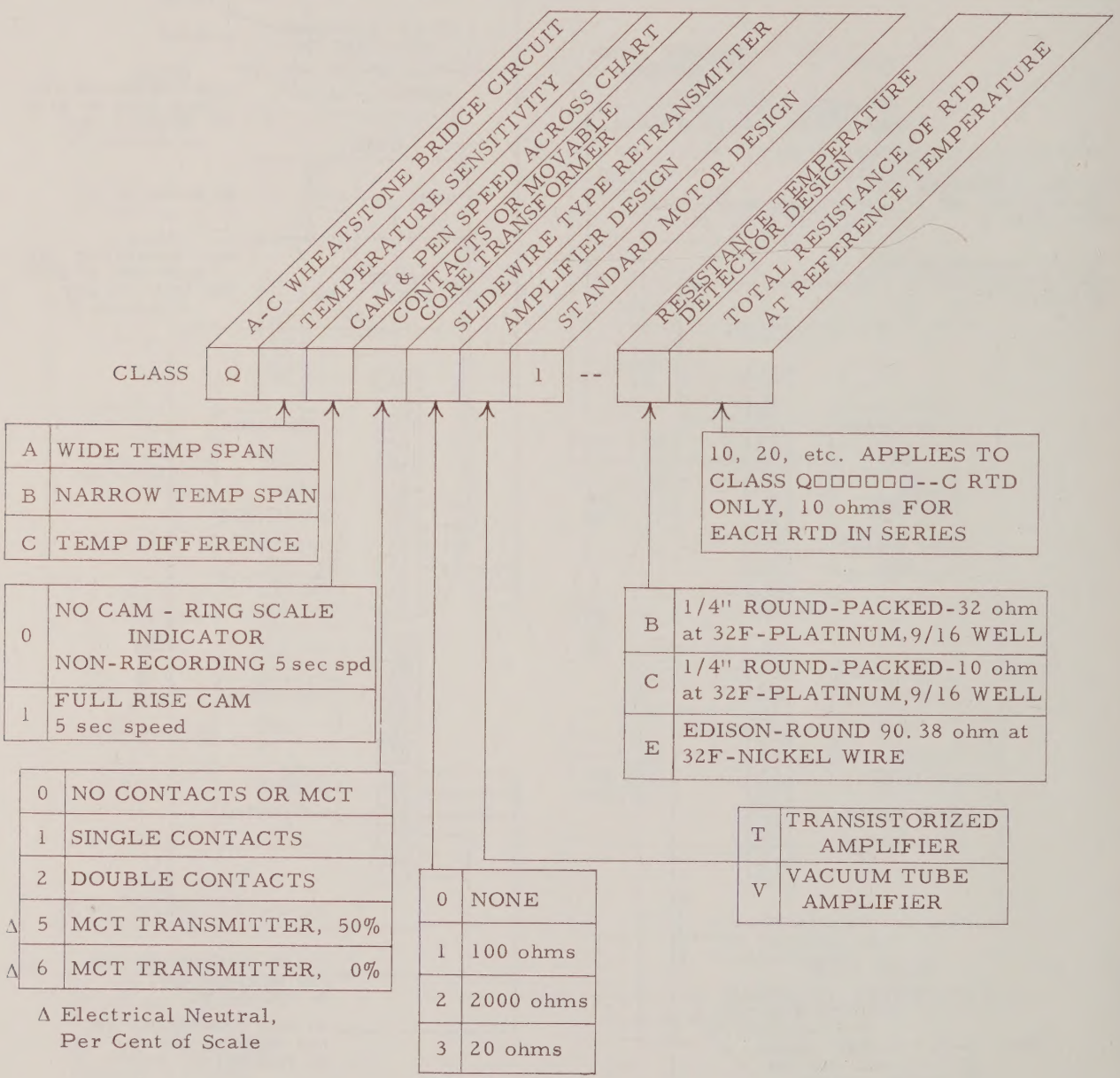


FIGURE 4 - External Connection Diagram for Class QC Circuits with --E Design (90.38 ohm) Detectors

EXPLANATION OF NOMENCLATURE


A-C WHEATSTONE BRIDGE CIRCUIT
TEMPERATURE SENSITIVITY
CAM & PEN SPEED ACROSS CHART
CONTACTS OR MOVABLE CORE TRANSFORMER
SLIDEWIRE TYPE RETRANSMITTER
AMPLIFIER DESIGN
STANDARD MOTOR DESIGN
RESISTANCE TEMPERATURE DETECTOR DESIGN
TOTAL RESISTANCE OF RTD AT REFERENCE TEMPERATURE
CLASS
Q
1
--
A WIDE TEMP SPAN
B NARROW TEMP SPAN
C TEMP DIFFERENCE
0 NO CAM - RING SCALE INDICATOR NON-RECORDING 5 sec spd
1 FULL RISE CAM 5 sec speed
0 NO CONTACTS OR MCT
1 SINGLE CONTACTS
2 DOUBLE CONTACTS
Δ 5 MCT TRANSMITTER, 50%
Δ 6 MCT TRANSMITTER, 0%
Δ Electrical Neutral, Per Cent of Scale
0 NONE
1 100 ohms
2 2000 ohms
3 20 ohms
T TRANSISTORIZED AMPLIFIER
V VACUUM TUBE AMPLIFIER
10, 20, etc. APPLIES TO CLASS Q□□□□□□--C RTD ONLY, 10 ohms FOR EACH RTD IN SERIES
B 1/4" ROUND-PACKED-32 ohm at 32F-PLATINUM,9/16 WELL
C 1/4" ROUND-PACKED-10 ohm at 32F-PLATINUM,9/16 WELL
E EDISON-ROUND 90.38 ohm at 32F-NICKEL WIRE

An "X" in any Nomenclature position indicates that in this respect the unit is special. An "X" as a suffix indicates that the unit includes some special feature not covered by Nomenclature.

NOTE: In the instructions contained herein, the basic Receiver circuit is designated as a Class QA, QB, or QC. The resistance temperature detector is designated by the letter following the dash (see eighth position in Nomenclature above), i.e., Class QA□□□□□--B indicates a wide temperature span measuring circuit using a 32 ohm resistance temperature detector.

INSTALLATION

External Connections and Wiring

External connection diagrams for Class QA, QB, and QC circuits are shown in Figures 1 thru 4.

1. Power Requirements

115 volts, 50 or 60 cycle power supply: 105 volts minimum, 125 volts maximum. ±2 cycles maximum variation in frequency. Power Load: 26 VA at .96 power factor, per Receiver.

2. Connecting Wire Requirements

a. Number of Wires: Measuring circuit -- 3 per Receiver (Class QA and QB circuits) or 6 per Receiver (Class QC circuits). Power Supply -- 2 per Recorder or Indicator.

b. Size and Maximum Length of Wires in Measuring Circuit:

CLASS QA and QB: Refer to Figure 5, 6, or 7, depending on design of resistance temperature detector (RTD) being used. Intersection of length and temperature ordinates must fall below curve of wire size.

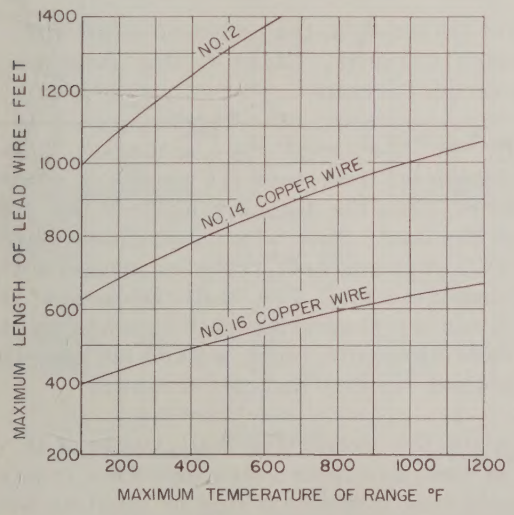


FIGURE 5 - Maximum Wire Size Curve for Class QA and QB Circuits with --B Design Detectors

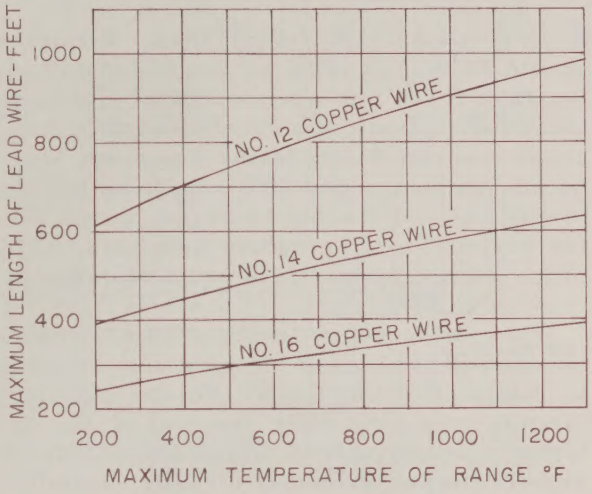


FIGURE 6 - Maximum Wire Size Curve for Class QA and QB Circuits with --C Design Detectors

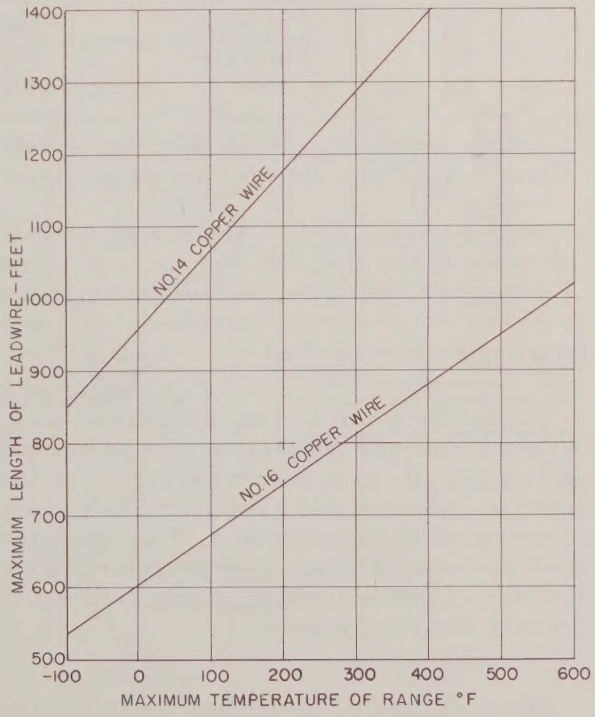


FIGURE 7 - Maximum Wire Size Curve for Class QA and QB Circuits with --E Design Detectors

The three leadwires connecting the resistance temperature detector (RTD) to the Receiver must be of equal resistance.

CLASS QC (all RTD's): Wire size should be No. 16 AWG or larger. Maximum length is 1,000 feet when wired according to these instructions. If a greater length is necessary consult Bailey Meter Company. Maximum resistance per line should be limited to 4 ohms, and the six leadwires connecting the resistance temperature detectors (RTD) to the Receiver must be of equal resistance.

A three-foot length of flexible cable is supplied with each temperature detector in Class Q□□□□□□--E (Edison detector) circuits to permit easy removal of the detector assembly. With Class Q□□□□□□--B or --C (Bailey detector) circuits, installation of a short length of flexible conduit at the temperature detector is recommended.

c. For the measuring circuit, use wires with a thermoplastic insulation, such as polyvinyl chloride or polyethylene. Insulation wall thickness must be suitable for at least 300 volt rated operation.

d. Measuring circuit wires must be run in metallic shielded cable or conduit. If wiring is run adjacent to power or control wires carrying current in excess of 30 amperes, the shield must be of magnetic material. The shield should be grounded only at the Recorder or Indicator end of the cable.

e. Measuring circuits to be run together with other Bailey Meter Company a-c measuring circuits can be combined in a common shielded cable or conduit per the distances listed in the following table:

*High Level	**Low Level	Maximum Recommended Distance that Measuring Circuit Wires may be run in Common Cable
1	1 or more	200 feet
2	1 or more	100 feet
0	3 or more	300 feet
0	2	400 feet

Whenever low level measuring circuits are Class Q for range spans of 300F or greater, the maximum recommended distance may be doubled.

*High Level Circuit: Measuring circuit operating at potential of several volts, such as Class J A-C Ratio Bridge Circuit or Class B A-C Voltage Balance Circuit.

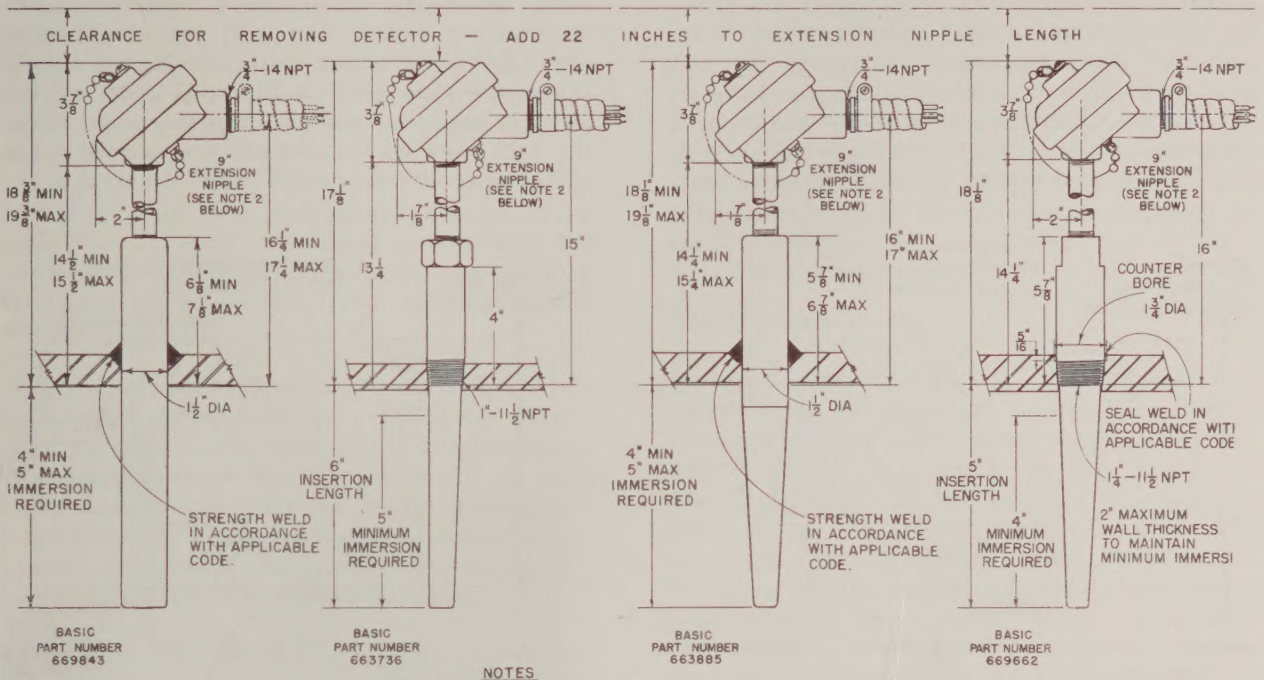
**Low Level Circuit: Measuring Circuit operating at potential in the order of millivolts, such as Class QA, QB and QC A-C Wheatstone Bridge Circuits, Class G Gas Analysis Circuit or Class G Smoke Density or Particle Concentration Circuit.

Locating Protecting Well

Bailey Detectors. The resistance temperature detector is inserted in a protecting well which is permanently inserted in the pipeline, furnace wall, duct, or other point of temperature measurement. This arrangement permits removal of the detector for inspection or test without requiring removal of the well from the system.

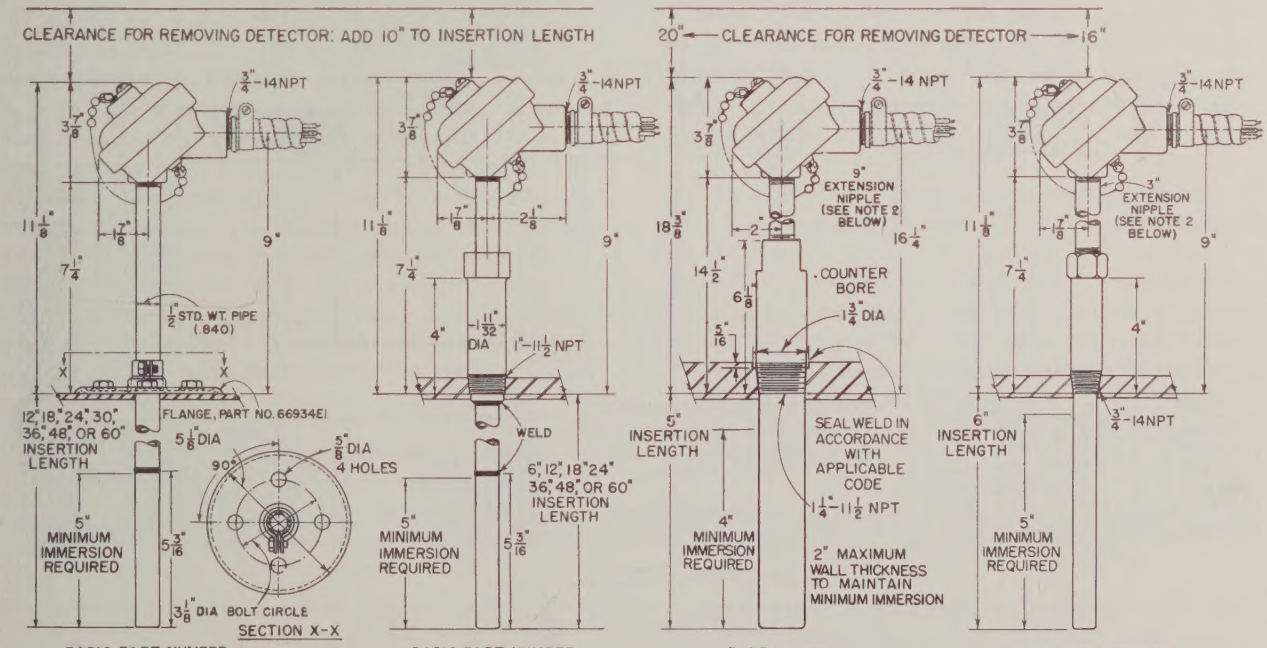
Standard Bailey protecting wells for installation in pipes and ducts are shown in Figures 8 and 9. They are constructed of materials suitable for the service. Class Q□□□□□□--B detectors (32 ohm) are held tightly in the well by springs. Class Q□□□□□□--C detectors (10 ohm) are spring loaded to force the detector against the bottom of the well. Both methods reduce vibration and improve heat transfer between the well and detector. The wall thickness required for the protecting well depends on the pressure the unit must withstand and the mechanical rigidity that is necessary.

Locate the protecting well where it is as free as possible from vibration. This is particularly true in a steam line or pipeline with high frequency vibration. Such vibration, when picked up by the resistance temperature detector, may cause detector failure by opening the measuring circuit.



NOTES

1. EXTERNAL WIRING, CONDUIT, AND PIPE OR DUCT BY CUSTOMER.
2. OTHER EXTENSION LENGTHS OF 2', 3', 4', 5', 6', 7', 8', 9', OR 10' AVAILABLE. IF USED, ADD ADDITIONAL LENGTH TO RELATED DIMENSIONS.

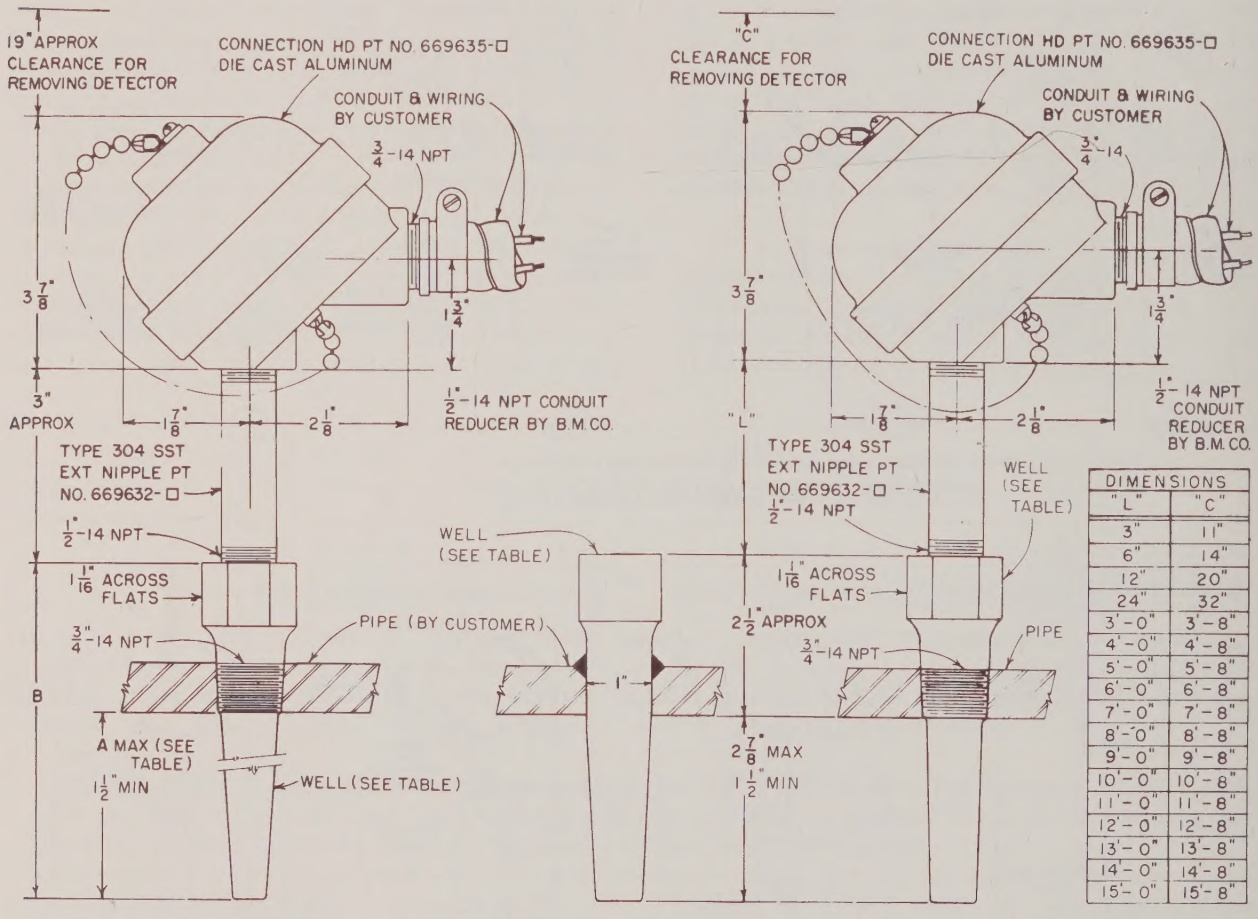


NOTES

1. EXTERNAL WIRING, CONDUIT, AND PIPE OR DUCT BY CUSTOMER.
2. OTHER EXTENSION LENGTHS OF 2', 3', 4', 5', 6', 7', 8', 9', OR 10' AVAILABLE. IF USED, ADD ADDITIONAL LENGTH TO RELATED DIMENSIONS

FIGURE 8 - Protecting Wells for --B Design (32 ohm) Detectors

High frequency vibration is usually caused by disturbances in high velocity fluid flow. To avoid these disturbances, locate the well where the flow is streamlined -- usually 15 to 25 pipe diameters of straight pipe downstream from any short radius bend, elbow, tee, two or more long radius bends immediately following each other, reducer, expander, or valve. The well may be located close to a single long radius bend, but should enter the pipe so that the well is in a plane at right angles to the plane of the bend. Also, the well may be located close to a gate valve outlet without excessive flow disturbances.



DIMENSIONS	
"L"	"C"
3"	11"
6"	14"
12"	20"
24"	32"
3'-0"	3'-8"
4'-0"	4'-8"
5'-0"	5'-8"
6'-0"	6'-8"
7'-0"	7'-8"
8'-0"	8'-8"
9'-0"	9'-8"
10'-0"	10'-8"
11'-0"	11'-8"
12'-0"	12'-8"
13'-0"	13'-8"
14'-0"	14'-8"
15'-0"	15'-8"

MEDIUM DUTY PROTECTING WELL

PART NO.	A	B	MATERIAL
669808-1	3"	5 3/8"	316 SST
669808-2	6"	8 3/8"	(ASTM SPEC
669808-3	12"	14 3/8"	A-182-F-316)
669808-4	3"	5 3/8"	2 1/4" CR MOLY
669808-5	6"	8 3/8"	(ASTM SPEC
669808-6	12"	14 3/8"	A-182-F-22)

NOTE

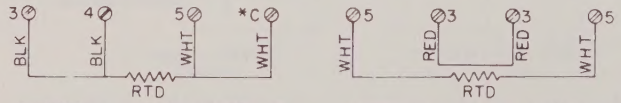
COMPLETE ASSEMBLIES CONSIST OF CONNECTION HEAD, NIPPLE, WELL, AND PYROTRON SEALED RTD (10 OHMS AT 32° F)

ASSEMBLIES SPRING LOADED FOR OPTIMUM HEAT TRANSFER

HEAVY DUTY PROTECTING WELL

PART NO.	TYPE	MATERIAL
669633-1	THREADED	316 SST (ASTM SPEC A-182-F-316)
669633-2		347 SST (ASTM SPEC A-182-F-347)
669633-3		2 1/4 CR MOLY (ASTM SPEC A-182-F-22)
669634-1	WELDED	316 SST (ASTM SPEC A-182-F-316)
669634-2		347 SST (ASTM SPEC A-182-F-347)
669634-3		2 1/4" CR MOLY (ASTM SPEC A-182-F-22)

*FOR CALIBRATION CHECK ONLY



RESISTANCE DETECTOR CONNECTIONS

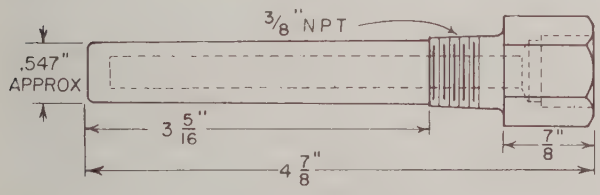
FIGURE 9 - Protecting Wells for --C Design (10 ohm) Detectors

For pipeline installations where the temperature of the fluid may be less than ambient, install the protecting well through the bottom wall of the line. This allows condensate to drain out of, instead of collecting inside, the well.

To protect the resistance temperature detector, be sure the detector is not in the protecting well when the well is inserted into the pipe or duct, and the well is to be welded.

To weatherproof a protecting well used in a Class Q□□□□□□--B or --C (Bailey detector) circuit, apply Shell Oil Corporation's Aeroshell Grease No. 11, or equal, to both male and female threads on the connection head body and cap before screwing the cap in place. The grease will not affect the margin of safety of the explosion-proof head.

CAUTION: The protecting well and extension nipple must be absolutely free of foreign material before the resistance temperature detector is installed. The presence of foreign matter will impede detector insertion and heat transfer. Therefore, carefully inspect the well and nipple before and after installation. Cleaning is most easily accomplished before the connection head, nipple, and well are assembled. Use no deposit leaving, toxic, or volatile solvents for cleaning. If pipe "dope" must be used during installation, apply it to the nipple threads so that it will not enter the nipple or well. If the nipple or well is to be exposed to boiler or flue gases or to other corrosive atmospheres, make sure that all connections are gas-tight.



300 PSIG PROTECTING WELL
PT NO. 664793-1

FIGURE 10 - Protecting Well for --E Design (Edison) Detectors

Edison Detectors. The protecting well for use with the Class Q□□□□□□--E, Edison design detector, is shown in Figure 10. This stainless steel well is designed for use up to a maximum pressure of 300 psig and a maximum temperature of 600F. For pressures and temperatures up to 50 psig and 600F, respectively, the Edison detector may be used without the protecting well.

Receiver

The Class QA, QB, or QC Pyrotron Receiver can be mounted in the Type WM55 Recorder in any of the four component positions -- A, B, C, or D -- as shown in Figures 1 thru 4 (rear view of Recorder) or in the Type WM53 Indicator in either the A or B position. The unit, which includes the Receiver wiring board, electronic amplifier, and motor-driven slidewire unit, is secured to the rear of the Recorder or Indicator case by four mounting screws, which are accessible when the amplifier cover is removed. (See Instruction Section E12-42.)

External electrical connections are made to the measuring and auxiliary terminal blocks adjacent to the Receiver, within the wiring channel on the rear of the Recorder or Indicator.

An adjustable link transmits the motion of the Receiver drive arm to the recording pen or pointer yoke. The Receiver requires a different link for each Recorder or Indicator case position. Each link is stamped with the letter of the position for which it is suitable. The method of connecting and disconnecting adjustable links is illustrated under "Installation of Additional Components" in Instruction Section E12-3.

If the Receiver is furnished already installed in the Recorder or Indicator.

1. Install Recorder or Indicator as outlined in Instruction Section E12-3 under "Installation". Place pens or pointers in service at this time.

2. The assembly has been factory calibrated and should require no further adjustment or calibration.

3. Test power source for correct voltage and frequency.

4. Make external electrical connections to Receiver (Figures 1 thru 4).

5. Turn on Recorder or Indicator. Allow one minute for amplifier warm-up. If Recorder or Indicator does not operate, follow fault correction procedure outlined under "Maintenance", page 17.

6. Set amplifier sensitivity adjustment, as described in Instruction Section E12-37 or E12-85.

If the Receiver is being added to a Type WM55 Recorder or Type WM53 Indicator, follow the instruction sheet that was shipped with the Receiver kit.

If the Receiver is being changed from one component position to another, use the adjustable link and pen or pointer assembly that is appropriate to the new position. If the pen or pointer assembly for the new component position is not already in service, install the correct assembly and start the pen or pointer, as described in Instruction Section E12-3 under "Installation of Additional Components". Attach the adjustable link to the Receiver drive arm leg that is stamped with the appropriate Recorder or Indicator case position letter.

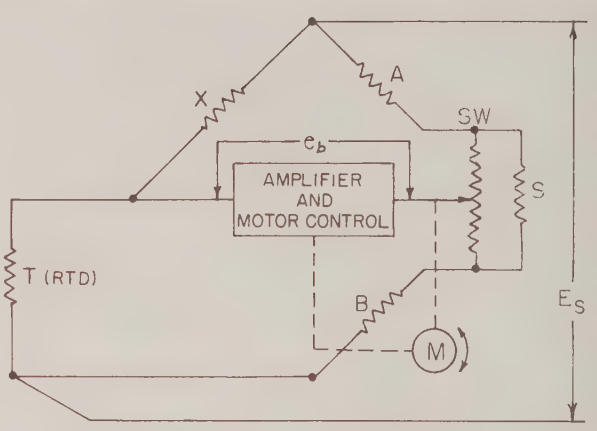


FIGURE 11 - Class QA and QB Bridge Circuit

DESCRIPTION

The basic Class QA, QB, or QC circuit consists of a resistance temperature detector and a Receiver unit, which are connected to form a modified a-c Wheatstone bridge, as shown in Figure 11. A detailed schematic is shown in Figure 12.

Pyrotron Bridge

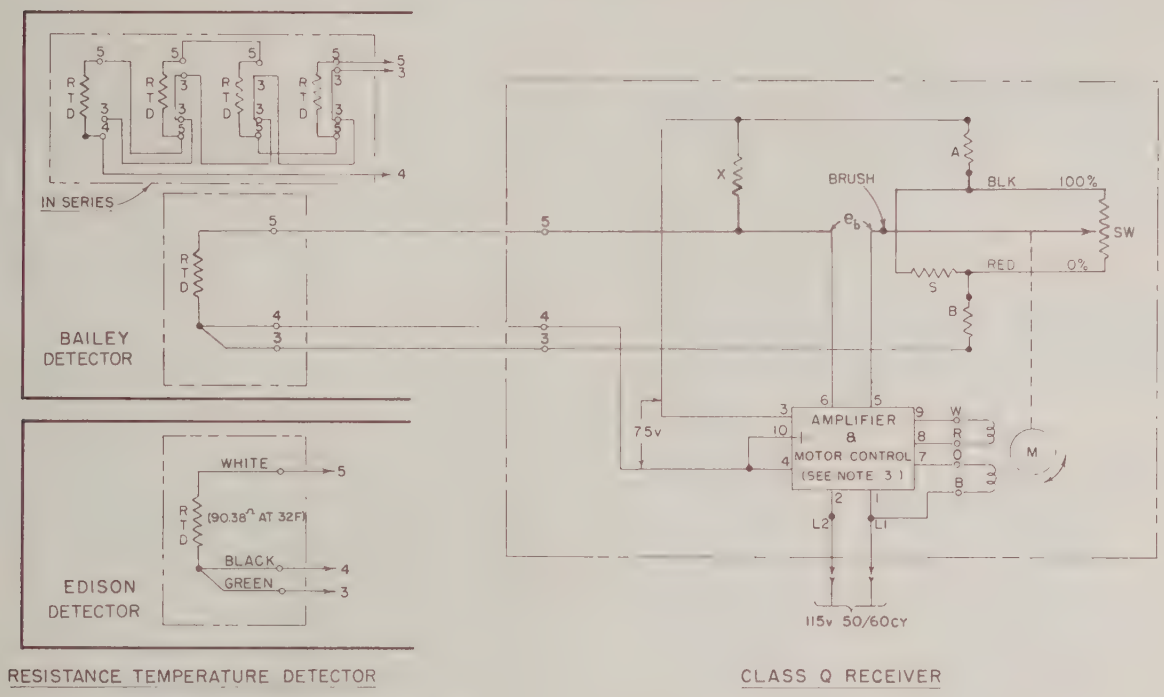
In the circuit shown in Figure 11, the Pyrotron bridge is formed by the calibrating resistance spools (A, B, X, and S), the measuring slidewire (SW), and the resistance temperature detector (T). When the bridge is balanced, voltage e_b is zero. The resistance of the detector, T, varies with detector temperature. When a change in T unbalances the bridge, the amplifier and motor control unit immediately senses the bridge unbalance voltage, e_b, and applies a corrective signal to the slidewire reversing motor, M, to rotate the slidewire so that the bridge is restored to balance. The values of A, B, X, and S are chosen so that the position of the slidewire contact accurately reflects the resistance of the temperature detector.

Although the relation between detector temperature and detector resistance is not exactly linear, temperature is recorded or indicated on a uniformly graduated chart because of the shape of the pen or pointer drive cam attached to the slidewire disc.

The method of amplification and motor control is explained in detail in amplifier Instruction Section E12-37 (vacuum tube) or E12-85 (transistorized).

Resistance Temperature Detectors

The 32 ohm Class Q□□□□□□--B Bailey resistance temperature detector consists of a platinum resistance coil completely enclosed in porcelain and packed in alumina powder (see Figures 13 and 15). The detector is accurately adjusted and stabilized to have a resistance of 32 ohms at 32F (see Table I on page 23 for incremental resistance values). All standard 32 ohm Class Q□□□□□□--B Bailey detectors used in Class QA or QB circuits are identical and can be interchanged or replaced in either of



RESISTANCE TEMPERATURE DETECTOR

CLASS Q RECEIVER

NOTE 1: CLASS QA & QB (BAILEY 32 OHM DETECTORS) ONLY– 2, 3, OR 4 RESISTANCE TEMPERATURE DETECTORS MAY BE CONNECTED IN SERIES TO OBTAIN AVERAGE TEMPERATURE.
EX: 2 DETECTORS – 16.0 OHMS EACH
3 DETECTORS – 10.67 OHMS EACH (AT 32F)
4 DETECTORS – 8.0 OHMS EACH

NOTE 2: CLASS QA & QB, BAILEY 10 OHM DETECTORS MAY ALSO BE CONNECTED FOR AVERAGING TEMPERATURE
EX: 2 DETECTORS – 20 OHMS TOTAL
3 DETECTORS – 30 OHMS TOTAL (AT 32F)
4 DETECTORS – 40 OHMS TOTAL
(SUMMATION OF RESISTANCE OF EACH 10 OHM DETECTOR GIVES TOTAL RESISTANCE.)

NOTE 3: AMPLIFIER UNIT PART NUMBERS:
CLASS QA□□□V□ – 666300-1
CLASS QB□□□V□ – 666300-2
CLASS QA□□□T□ – 6610434-1
CLASS QB□□□T□ – 6610434-2

KEY A,B,S,X–CALIBRATING SPOOLS
e_b — UNBALANCE VOLTAGE
SW — MEASURING SLIDEWIRE – 100 OHMS
RTD — RESISTANCE TEMPERATURE DETECTOR

FIGURE 12 - Schematic Wiring Diagram of Class QA and QB Circuits

these circuits. However, Class Q□□□□□□--B detectors used in Class QC circuits are not identical and should be purchased in pairs as outlined under "Measurement of Temperature Difference" below. The temperature averaging circuit requires Class Q□□□□□□--B detectors of lower resistance (see "Measurement of Average Temperature" below).

The 10 ohm Class Q□□□□□□--C Bailey resistance temperature detector (Figure 14) is similar in construction to the 32 ohm Class Q□□□□□□--B detector. The 10 ohm detector is accurately adjusted and stabilized to have a resistance of 10 ohms at 32F. Refer to Table II on page 29 for incremental resistance values. All standard 10 ohm Class Q□□□□□□--C detectors are identical and can be interchanged or replaced in any Class QA, QB, or QC circuit. However, with this type detector, the averaging circuit does not require detectors of lower resistance (see paragraph dealing with averaging circuits below).

The Class Q□□□□□□--E Edison resistance temperature detector employs a nickel resistance in a sealed tube (see Figure 16). This detector has a resistance of 90.38 ohms at 32F. Refer to Table III on page 35 for resistance values from -95F to 570F, and from -70C to 300C. These detectors are interchangeable in any Class Q□□□□□□--E circuit. They are <u>not</u> used for temperature averaging.

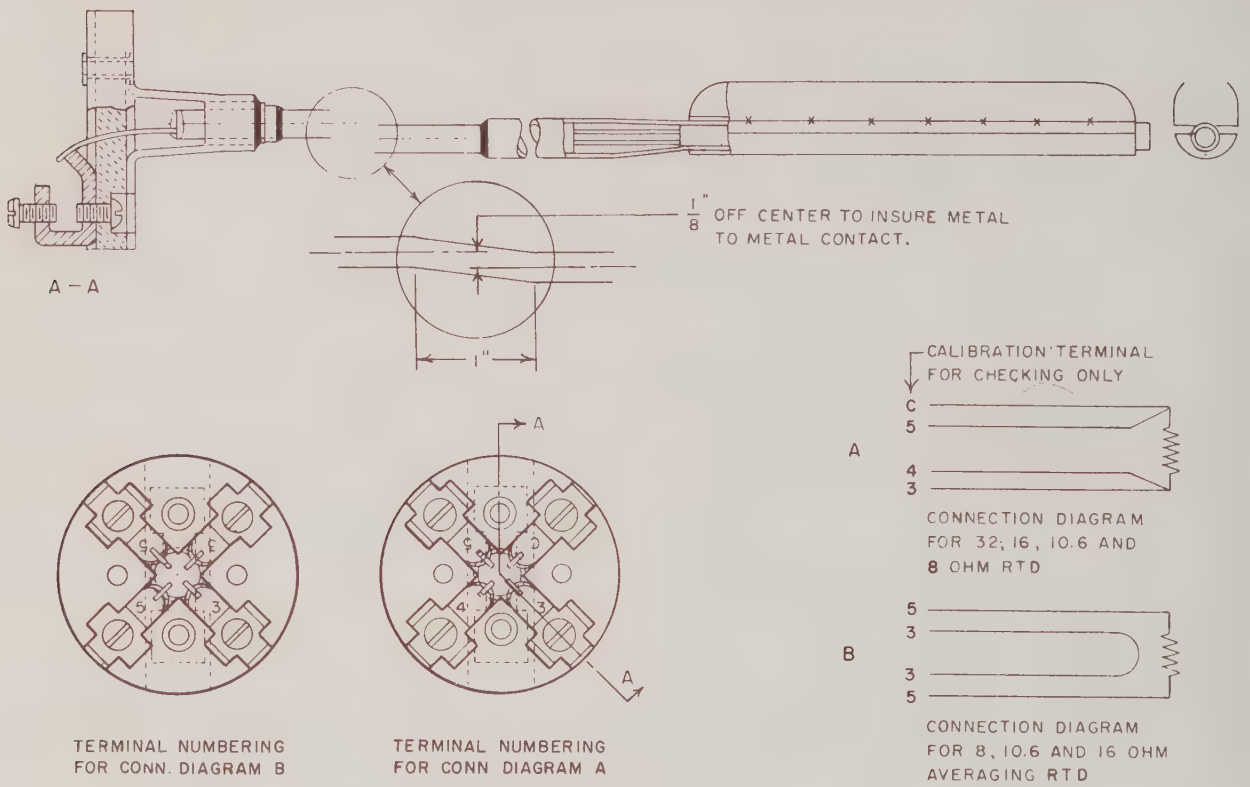


FIGURE 13 - Bailey 32 ohm Resistance Temperature Detector (--B Design)

DESCRIPTION	PART NO.	"A"
3 WIRE RTD FOR SINGLE POINT MEASUREMENT	669399-1	24"
	669399-2	36"
	669399-3	48"
	669399-4	60"
4 WIRE RTD FOR AVERAGE MEASUREMENT	669399-5	24"
	669399-6	36"
	669399-7	48"
	669399-8	60"

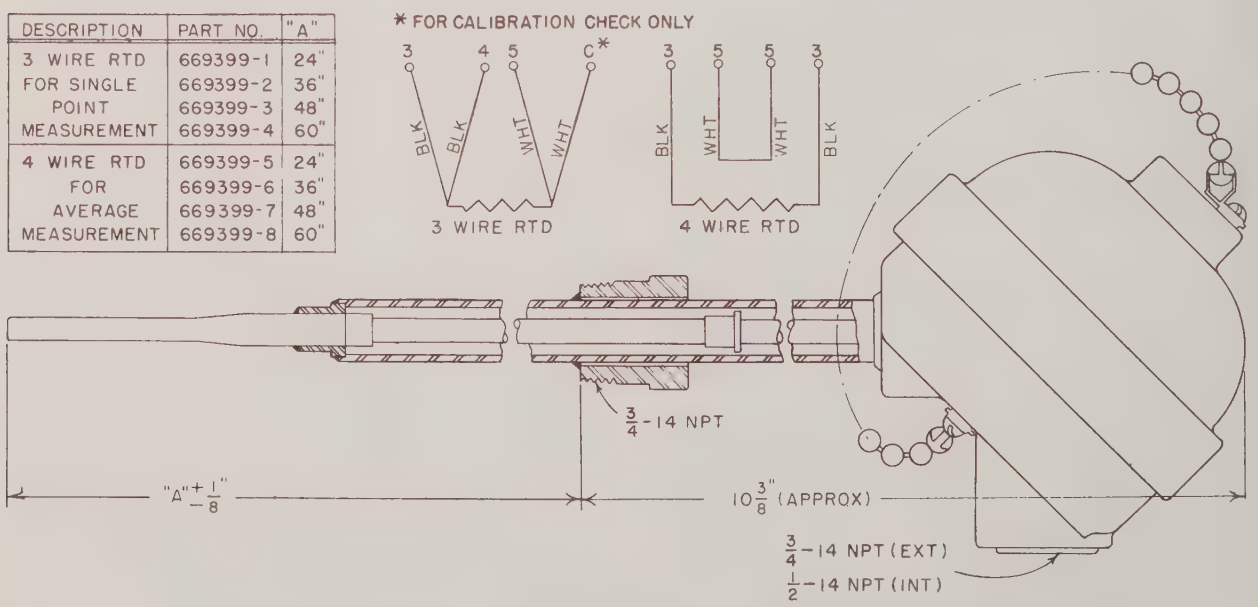


FIGURE 14 - Bailey 10 ohm Resistance Temperature Detector (--C Design)

Measurement of Average Temperature

In certain applications, such as the measurement of flue gas temperature, it is desirable to connect several detectors in series to record or indicate an average temperature. In Class QA and QB circuits, two, three, or four detectors may be connected this way (see Figure 12).

Bailey 32 ohm detectors (Class Q□□□□□□ --B) used to measure average temperature are sized so that the total resistance of all detectors in series is equal to that of a single 32 ohm detector (see notes in Figure 12). The measuring circuit is similar to the standard single detector circuit.

When the Bailey 10 ohm detector (Class Q□□□□□□--C) is used to measure average temperature, the resistances are all equal (10 ohms); and their total is a multiple of a single standard detector. (Summation of resistance values of all 10 ohm detectors used will give total resistance.) Therefore, the A, B, X, and S resistance spools are sized accordingly.

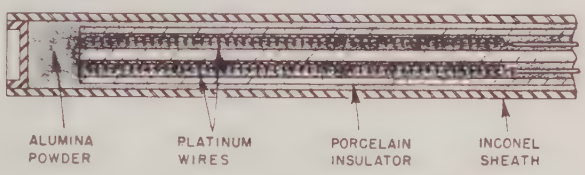
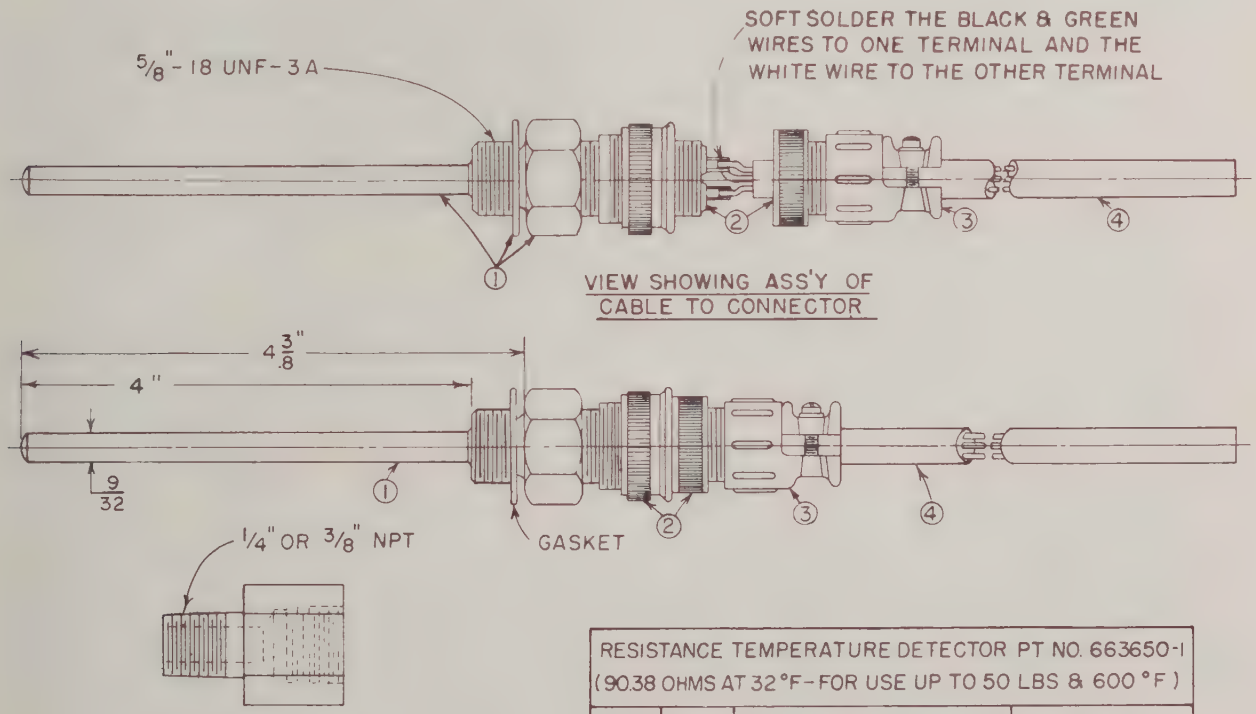


FIGURE 15 - Cutaway View of --B and --C Design Sensing Elements



ADAPTERS (OPTIONAL)

1/4" NPT PT NO. 663808-1
3/8" NPT PT NO. 663809-1
(NOT INCLUDED WITH PART NO. 663650-1)

RESISTANCE TEMPERATURE DETECTOR PT NO. 663650-1
(90.38 OHMS AT 32°F - FOR USE UP TO 50 LBS & 600°F)

	REQD	NAME	PART NO.
1	1	RESISTANCE ELEMENT	663647-1
2	1	PLUG CONNECTION	663648-1
3	1	CABLE CLAMP	663649-1
4	3 FT	LEAD WIRE	B.M CO NO 40

FIGURE 16 - Edison 90.38 ohm Resistance Temperature Detector (--E Design)

Measurement of Temperature Difference

Figure 17 shows the Pyrotron bridge modified for the measurement of temperature difference. Since the resistance of spools X and Y are equal, slidewire position accurately reflects the difference between the resistances of the two detectors, when proper values of A and S are chosen. The shape of the pen or pointer drive cam permits the recording or indicating of temperature difference on a uniformly graduated chart. A detailed schematic of this bridge is shown in Figure 18.

For a temperature difference circuit the detectors should be factory matched and detector replacements should be purchased in pairs.

Contacts and Retransmitters

One or two electrical contacts may be furnished with the Class QA, QB, or QC Receiver for alarms, controls, etc. In addition, retransmitters (slidewire or MCT type) may be installed in the Receiver. These accessories are described in Instruction Section E12-42.

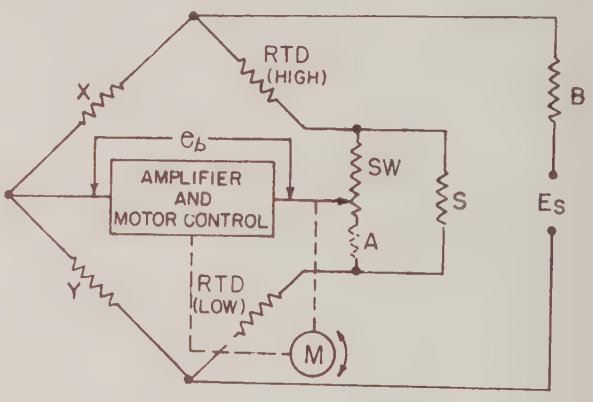
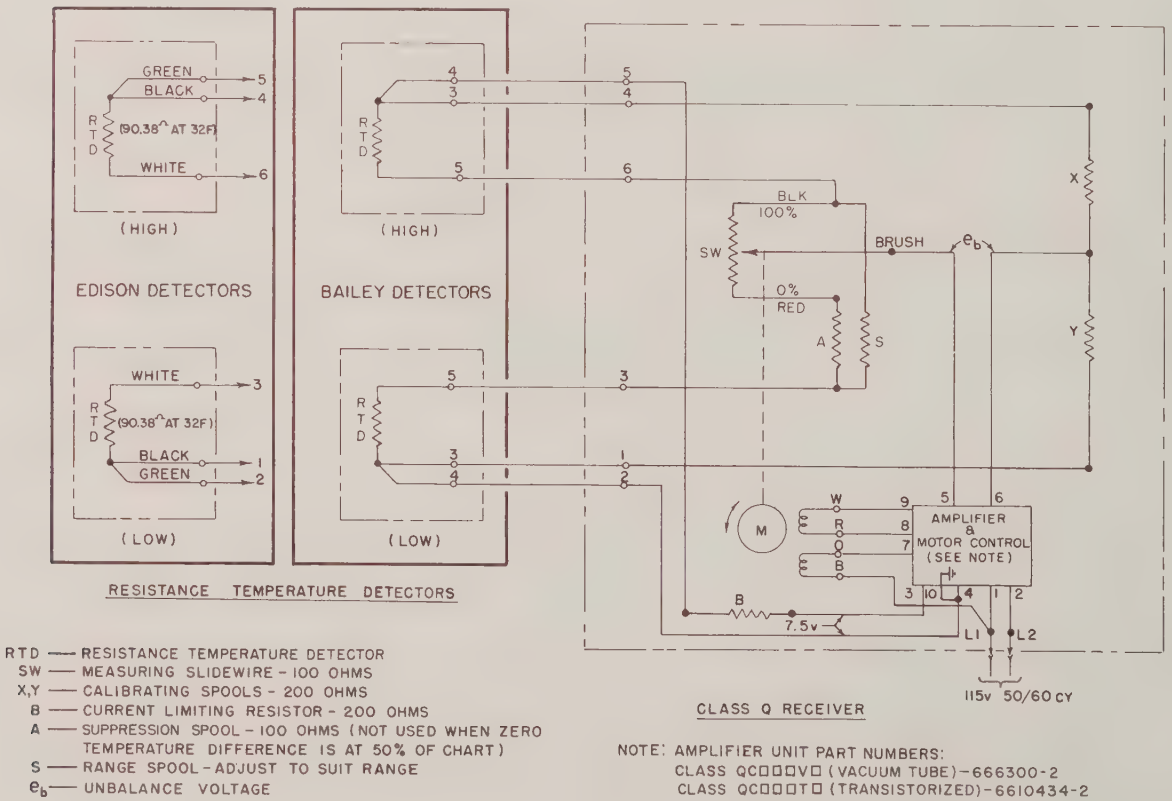


FIGURE 17 - Class QC Bridge Circuit



RTD — RESISTANCE TEMPERATURE DETECTOR
SW — MEASURING SLIDEWIRE - 100 OHMS
X,Y — CALIBRATING SPOOLS - 200 OHMS
B — CURRENT LIMITING RESISTOR - 200 OHMS
A — SUPPRESSION SPOOL - 100 OHMS (NOT USED WHEN ZERO TEMPERATURE DIFFERENCE IS AT 50% OF CHART)
S — RANGE SPOOL - ADJUST TO SUIT RANGE
e_b — UNBALANCE VOLTAGE

NOTE: AMPLIFIER UNIT PART NUMBERS:
CLASS QC□□□VD (VACUUM TUBE) - 666300-2
CLASS QC□□□TD (TRANSISTORIZED) - 6610434-2

FIGURE 18 - Schematic Wiring Diagram of Class QC Circuit

ADJUSTMENT AND CALIBRATION

Class QA, QB, and QC Pyrotron Receivers are furnished precalibrated. However, before placing the unit in service, check the calibration as outlined below.

Calibration of Recording Pen or Indicating Pointer

The procedure for checking calibration of the Receiver pen or pointer is outlined in Instruction Section E12-42, under "Adjustment and Calibration" (omit steps 3 and 4). Also, note that calibration of a recording pen or indicating pointer is necessary when the Receiver's position in the Type WM Recorder or Indicator case is changed or when a Receiver is added to a previously furnished Recorder or Indicator, etc.

Checking Receiver Calibration

To check receiver calibration, use a decade box with minimum increments of at least 0.1 ohm in place of the detector. (For range spans of 100F or less, minimum increments of 0.01 ohm may be found necessary.) Use a decade box that is known to be correct. Check calibration as follows:

1. Disconnect RTD wiring at Receiver wiring board (see Figures 1 thru 4).

2. Connect one side of decade box (two decade boxes required for Class QC) to Receiver wiring board terminal 5 (terminals 3 and 6 for Class QC). From the other side of decade box, connect two wires -- one to terminal 3 (terminals 1 and 4 for Class QC) and one to terminal 4 (terminals 2 and 5 for Class QC).

3. Set resistance box for various values within temperature range of Receiver, as listed in applicable table (see pages 23 thru 35). For each setting, Receiver should read at corresponding temperature.

4. If readings are incorrect, refer to item 7 in Fault Correction Chart on page 20.

Amplifier Sensitivity Adjustment

This adjustment is described in amplifier Instruction Section E12-37 (vacuum tube) or E12-85 (transistorized).

MAINTENANCE

Information pertaining to the measuring circuit is given below. Maintenance instructions for the Recorder, Indicator, Amplifier Unit, and Electrical Receivers in general, may be found in the Instruction Sections listed under "Cross-References" on page 1.

Resistance Temperature Detector

Under normal operating conditions the detector will have a long life and will maintain its accuracy. Inspect detectors and wells periodically. Occasional replacement of the detector may be made necessary by extreme conditions such as severe mechanical vibration.

If the Pyrotron fails to operate or operates incorrectly when first installed, perform the following checks in the sequence given:

1. Check power supply to Recorder or Indicator (Figures 1 thru 4):

a. Recorder or Indicator case for illumination;

b. Case power switch is on;

c. Main fuses located adjacent to power switch;

d. Recorder chart drive for motion.

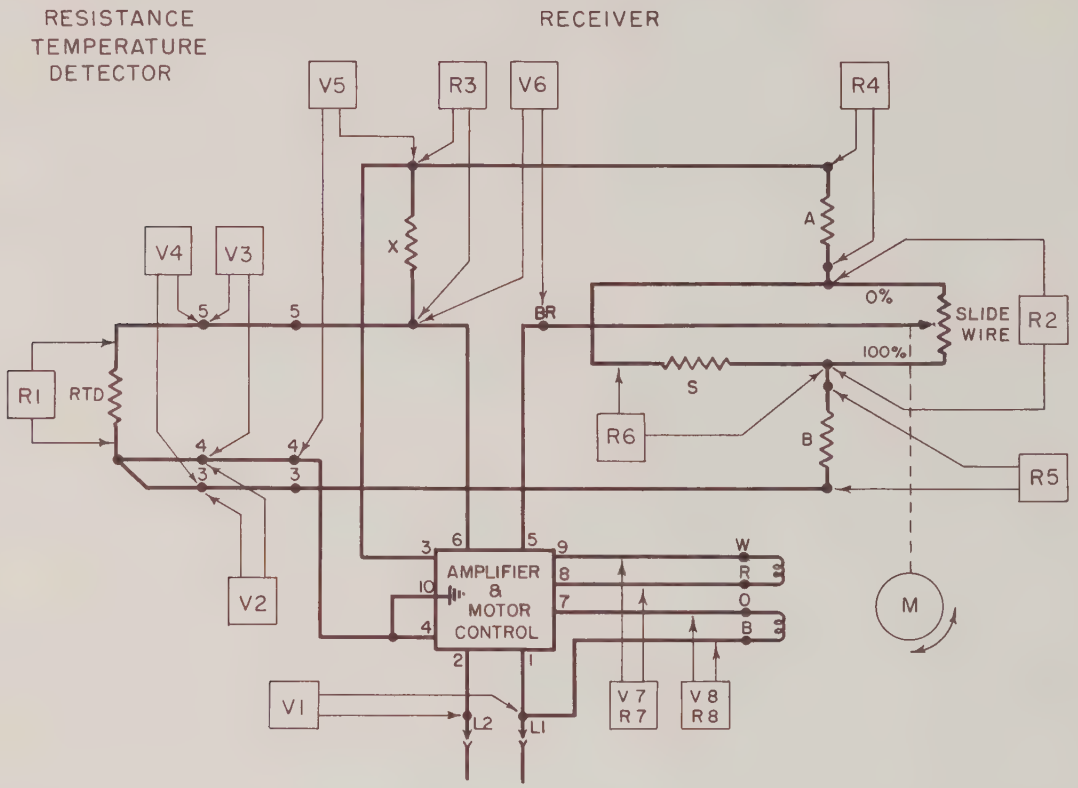
2. Check power supply to Receiver:

a. Vacuum tube amplifier - remove amplifier cover and check that tube filaments are "glowing". If not, make checks c and d below.

b. Transistorized amplifier - check for torque on slidewire motor. If there is no torque, make checks c and d below.

c. Check amplifier fuse.

d. Check amplifier power supply plug.



A-C VOLTAGE MEASUREMENTS MADE ON SCALE HAVING 1000 Ω/V RESISTANCE OR GREATER, EXCEPT WHERE NOTED.

V1 - 105-125V
V2 - 0
V3,V4 - .25-.778V (10 OHM RTD)
.48-1.38V (32 OHM RTD)
V5 - 7.5V
V6 - 0 AT BALANCE (USE VTVM)
V7 - 20-45V AT BALANCE
110-170V RUNNING
V8 - 185-210V

RESISTANCE MEASUREMENTS MADE WITH CONNECTIONS 3, 4, &5 DISCONNECTED (VALUES APPROXIMATELY ±10% EXCEPT R1)

R1 - SEE TABLES I AND II AT REAR OF THIS INSTRUCTION SECTION (DISCONNECT RTD)
R2 - 100 OHMS (WITH S SPOOL REMOVED)
R3, R4, R5 - MARKED ON SPOOLS
R6 - MARKED ON SPOOL (REMOVE SPOOL TO MEASURE)
NOTE: RESISTANCE BETWEEN CONDUCTORS AND BETWEEN CONDUCTORS AND GROUND MUST BE 250,000 OHMS OR MORE

RESISTANCE MEASUREMENTS MADE WITH CONNECTIONS W,R,O, & B (MOTOR) DISCONNECTED (VALUES APPROXIMATELY ±10%)

R7, R8 - 800 OHMS at 80F (HOLTZER-CABOT MOTOR)

580 OHMS at 80F (BODINE MOTOR)

FIGURE 19 - Class QA and QB Circuit Resistance and Voltage Measurements

3. Check external connections: Disconnect RTD at Receiver wiring board and insert decade box (see "Adjustment and Calibration", page 17). Set equal to 50% of range.

a. Class QA and QB

(1) Short terminal 3 to 5. The pen or pointer should go to minimum chart.

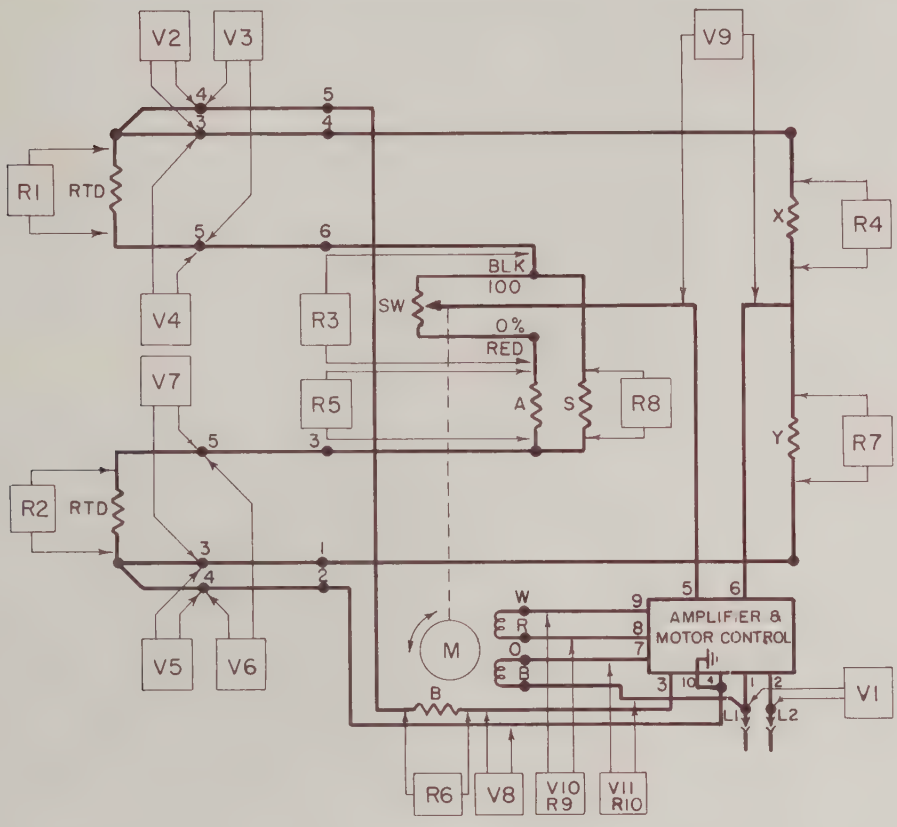
(2) Open connection to terminal 5. The pen or pointer should go to maximum chart.

(3) Open connection to terminal 3. The pen or pointer should go to minimum chart.

b. Class QC

(1) The pen or pointer should go to minimum chart if any of the following tests are made at the Receiver terminals:

Terminal 4 shorted to 6
Connection to terminal 3 opened
Connection to terminal 4 opened



A-C VOLTAGE MEASUREMENTS MADE ON SCALE HAVING 1000 Ω/V RESISTANCE OR GREATER, EXCEPT WHERE NOTED.

V1 - 105 - 125V
V2, V5 - 0
V3, V4, V6, V7 - 0.5 - 2.5V
V8 - 7.5V
V9 - 0 AT BALANCE (USE VTVM)
V10 - 20 - 45V AT BALANCE
110 - 170V RUNNING
V11 - 185 - 210V

RESISTANCE MEASUREMENTS MADE WITH CONNECTIONS 1 THRU 6 DISCONNECTED (VALUES APPROXIMATELY ±10% EXCEPT R1 AND R2)

R1, R2 - SEE TABLES I AND II AT REAR OF THIS INSTRUCTION SECTION (DISCONNECT RTD)
R3 - 100Ω (WITH S SPOOL REMOVED)
R4, R5, R6, R7 - MARKED ON SPOOLS
R8 - MARKED ON SPOOL (REMOVE SPOOL TO MEASURE)

NOTE: RESISTANCE BETWEEN CONDUCTORS AND BETWEEN CONDUCTORS AND GROUND MUST BE 250,000Ω OR MORE.

RESISTANCE MEASUREMENTS MADE WITH CONNECTIONS W, R, O, & B (MOTOR) DISCONNECTED (VALUES APPROXIMATELY ±10%)

R9, R10 - 800Ω at 80F (HOLTZER-CABOT MOTOR)

500Ω at 80F (BODINE MOTOR)

FIGURE 20 - Class QC Circuit Resistance and Voltage Measurements

(2) The pen or pointer should go to maximum chart when:

Terminal 1 shorted to 3
Connection to terminal 1 opened
Connection to terminal 6 opened

(3) Short terminal 1 to 2. Pen or pointer should drop slightly.

(4) Short terminal 4 to 5. Pen or pointer should rise slightly.

4. Check circuit voltages and resistances as shown in Figures 19 and 20.

5. Replace the Amplifier Unit with a spare, if motor will not reposition when an unbalance voltage is received. Refer to Instruction Section E12-37 or E12-85. If the reversing motor fails or operates erratically, refer to Instruction Section E12-42.

FAULT CORRECTION CHART FOR CLASS QA, QB, AND QC RECEIVERS

NOTE: In the following chart, substitute the words "Indicator" and "Pointer" for "Recorder" and "Pen" when checking Type WM53 Indicator faults.

Fault	Probable Cause
1. Pen draws circle on chart and does not respond to changes in temperature.	a. Amplifier failure. Amplifier input (pins 5 and 6 on Amplifier socket) short-circuited. Blown fuse in Amplifier. b. Motor rotor or gear reduction unit frozen or jammed. Slidewire disc assembly should turn freely when power supply to Recorder is off.
2. Erratic pen motion (not caused by rapidly changing temperature).	a. Faulty slidewire contact. Slidewire brush must make positive contact over entire slidewire travel. Excessive tension will cause wear. Slidewire must be clean and free from all foreign matter. Do not use any abrasive material when cleaning. b. Loose connection in measuring circuit or flexible slidewire leads.
3. Pen drifts over chart and does not follow temperature changes.	a. Class QA & QB: open line or connection to terminal 4. b. Class QC: open line or connection to terminal 2 or 5; open resistor B; line to terminal 4 or 5 grounded. c. Defective Amplifier. Input leads to Amplifier pins 5 and 6 not connected.
4. Pen is at top of chart and does not follow temperature changes.	a. Class QA & QB: open resistor A, or open line or connection to terminal 5; open temperature detector; shorted resistor B or X, or line to terminal 6 grounded. b. Class QC: open resistor Y, or open line or connection to terminal 1 or 6; "high" temperature detector open; shorted resistor X, shorted "low" temperature detector, or line to terminal 3 grounded.
5. Pen is at bottom of chart and does not follow temperature changes.	a. Class QA & QB: open resistor B or X; open line or connection to terminal 3; shorted resistor A, or 5 shorted to 3 or 4 (shorted temperature detector). Class QA: line to terminal 2 or 4 grounded. Class QB: line to terminal 5 grounded. b. Class QC: open resistor X, or open line or connection to terminal 3 or 4; "low" temperature element open; shorted resistor Y, shorted "high" temperature detector.
6. Insensitive or sluggish operation.	a. Defective Amplifier or Amplifier tubes. b. Excessive leakage between conductors and power circuits. Refer to external wiring recommendations. Resistance to ground should be in excess of 250,000 ohms. c. Low power supply voltage.

Fault	Probable Cause
7. Pyrotron Receiver not in calibration.	a. Damaged or bent linkage, loose adjustment, etc. b. Change in resistance of calibration spools or slidewire as a result of shorted turns or mechanical damage. c. Range increase -- open resistor S, or open slidewire shunt resistor (see Section E12-42). d. The leakage resistance between any lead of a detector and element sheath must be greater than 1,000,000 ohms at normal operating temperature. It must be greater than 10,000,000 ohms at room temperature (check with Recorder disconnected).

REPLACEMENT PARTS

Spare Parts Kits

The applicable Spare Parts Kits referred to in Parts Drawing E51-35 (Figure 21) should be carried in stock. Specify the Spare Parts Kit part number to order a complete kit. Refer also to "Ordering Individual Parts" below.

Ordering Individual Parts

Figure 21 shows the assembly, part numbers, and Spare Parts Kits for Class QA, QB, and QC Pyrotron Receivers. This drawing will normally apply to the Receiver furnished. However, there may be individual differences in specific Receivers because of:

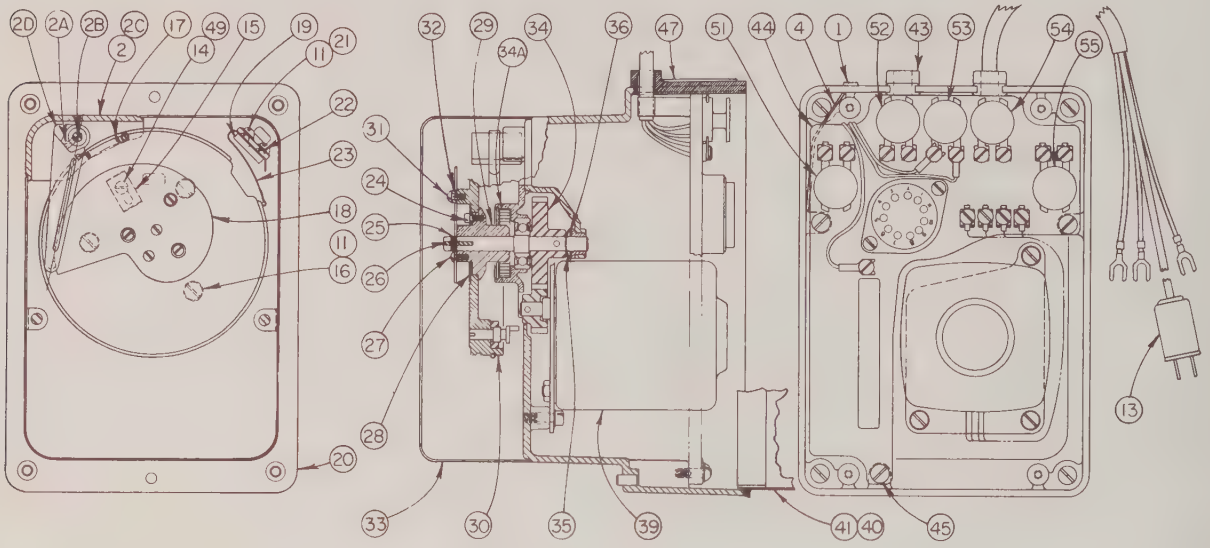
a. Design changes made since the printing of this Instruction Section.

b. Special design of the Receiver furnished to make it suitable for a special application.

Therefore, when ordering parts, assure correct replacements for the Receiver by specifying on the order:

1. Complete nomenclature (Class and Serial Number) of instrument for which parts are desired.

2. Parts Drawing on which each part is illustrated. (The Parts Drawing number is given in the title for the Figure.)



ITEM	PART NO.	NAME
1	CODE LABEL	SPECIFY NO. ON CODE LABEL WHEN ORDERING PTS.
2	668059-1	CAM FOLLOWER SHAFT & DRIVE ARM ASSY. INCLUDES:
2A	661617-1	CONE PT. SET SCREW, 2 REQD
2B	666331-1	CAM FOLLOWER SHAFT
2C	666316-1	CORNER BRKT ASSY.
2D	666333-1	CAM FOLLOWER ASSY.
3	NO. 8 SAE	LOCKWASHER, 3 REQD
4	6612342-1	INSULATING PLATE
8	8-32x1/2"	RD HD SCREW, 3 REQD
11	NO. 1106	SHAKEPROOF LK WASH, 5 REQD
13	1941496-1	CONNECTION PLUG
14	4-40-3/16"	RD HD SCREW
15	661701-1	WIRE CLAMP
16	6-32x1/4"	RD HD SCREW, 3 REQD
17	661483-1	CAM ARM SPRING
18	666433-1	CAM, SPECIFY RECEIVER RANGE FOR FACTORY CALIB.
19	666321-1	BRUSH SUPPORT
20	666431-1	MTG. BRKT. ASSY.
21	6-32x5/16"	RD HD SCREW, 2 REQD
22	3-48x3/16"	RD HD SCREW, 2 REQD
23	666366-1	BRUSH ASSY.
24	3-48x1/4"	FIL. HD SCREW, 2 REQD
25	3-48x3/16"	HDLS. CUP PT. SET SCREW
26	663016-1	SPRING KEY

ITEM	PART NO.	NAME
27	3-48x1/4"	RD HD SCREW, 2 REQD
28	661501-1	DISC CLAMP
29	666326-1	DISC HUB
30	661805-36	DISC ASSY.
31	4-40x5/16"	RD HD THD CUTTING SCREW
32	662153-1	DOWEL SLEEVE
33	666439-1	DISC COVER ASSY.
34	666320-1	SHAFT GEAR & BRG. ASSY. INCLUDES:
34A	667096-1	BACKLASH SPRING
35	666328-1	SPRING WASHER
36	19734-18	WASHER
39	SEE TABLE	MOTOR ASSY.
40	SEE TABLE	AMPLIFIER ASSY, SEE NOTE 3, 4
41	666618-1	AMPLIFIER COVER ASSY.
43	35396-1	GROMMET
44	SEE TABLE	WIRING ASSY.
45	8-32x1/2"	RD HD INTERNAL SEMS
47	1961013-1	IDENTIFICATION PLATE, SEE NOTE 1, 2 REQD
49	NO. 1204	SHAKEPROOF LOCKWASHER
51	SEE TABLE	RESISTANCE SPOOL
52	SEE TABLE	RESISTANCE SPOOL
53	SEE TABLE	RESISTANCE SPOOL
54	SEE TABLE	RESISTANCE SPOOL
55	SEE TABLE	RESISTANCE SPOOL

CLASS NOMENCLATURE (OLD)	CLASS NOMENCLATURE (NEW)	ITEM 39 MOTOR	ITEM 40 AMPLIFIER	ITEM 44 WIRING ASSY	ITEM 51 RES. SPOOL	ITEMS 52, 53, & 54 RES. SPOOLS	ITEM 55 RES. SPOOL
Q1, Q4	QA□□□V	666329-1	666300-1	666720-1	666436-□ SEE NOTE 2	666436-□ SEE NOTE 2	OMIT
	QA□□□T	6611136-1	6610434-1				
Q2, Q5	QB□□□V	666329-1	666300-2				
	QB□□□T	6611136-1	6610434-2				
Q3, Q6	QC□□□V	666329-1	666300-2	666723-1			666436-□ SEE NOTE 2
	QC□□□T	6611136-1	6610434-2				
	Q7□□□V	666329-1	666300-1	666724-1	666436-3	OMIT	666436-1
	Q7□□□T	6611136-1	6610434-1				

SPARE PARTS KITS			
QTY	250000-1 FOR CLASS Q□□□□V	250005-1 FOR CLASS Q□□□□T Q□□□□T	PARTS SHOWN ON PARTS DWG. NO:
2	194776-1	194776-1	E12-77 — SEE INSTRUCTION SECTION E12-37
1	1941223-3	-	
1	1941224-3	-	
1	1941224-4	-	
1	1941327-1	-	
1	ITEM 23	ITEM 23	E51-35
1	ITEM 39	ITEM 39	

NOTES:

1. WHEN ORDERING PARTS SPECIFY CLASS, RANGE, AND RECORDER OR INDICATOR POSITION (SHOWN ON IDENTIFICATION PLATE).
2. WHEN ORDERING RESISTANCE SPOOL PT. NO. 666436-□ SPECIFY RESISTANCE VALUE IN OHMS.
3. FOR DETAILS OF VACUUM TUBE AMPLIFIER UNIT, SEE PTS. DWG. E12-77 IN INSTRUCTION SECTION E12-37. FOR DETAILS OF TRANSISTORIZED AMPLIFIER UNIT, SEE PTS. DWG. E12-71 IN INSTRUCTION SECTION E12-85.
4. ITEM 40 IS AN OPTIONAL RECOMMENDED SPARE PART.

FIGURE 21 - Parts Drawing E51-35, Class QA, QB, and QC Receivers

TABLE I - FAHRENHEIT SCALE

CLASS Q□□□□□□--B DETECTORS (32 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F		-390	-380	-370	-360	-350	-340	-330	-320	-310	
	-0		1.29	1.84	2.46	3.14	3.85	4.59	5.35	6.11	6.88	
	-1		1.23	1.77	2.39	3.07	3.78	4.52	5.27	6.03	6.80	
	-2		1.18	1.72	2.33	3.00	3.70	4.44	5.20	5.96	6.73	
	-3		1.13	1.66	2.27	2.93	3.63	4.37	5.12	5.88	6.65	
	-4		1.08	1.61	2.21	2.86	3.56	4.29	5.05	5.81	6.57	
-390F	-5		1.04	1.55	2.14	2.80	3.49	4.22	4.97	5.73	6.50	
	-6		0.99	1.50	2.08	2.73	3.42	4.15	4.89	5.65	6.42	
	-7		0.95	1.44	2.02	2.66	3.35	4.07	4.82	5.58	6.34	
	-8		0.91	1.39	1.96	2.59	3.28	4.00	4.74	5.50	6.27	
	-9		0.87	1.34	1.90	2.52	3.21	3.92	4.67	5.43	6.19	
	°F	-300	-290	-280	-270	-260	-250	-240	-230	-220	-210	
	-0	7.65	8.42	9.19	9.95	10.71	11.46	12.22	12.97	13.72	14.47	
	-1	7.57	8.34	9.12	9.88	10.63	11.39	12.15	12.90	13.65	14.40	
	-2	7.50	8.27	9.04	9.80	10.56	11.31	12.07	12.82	13.57	14.32	
	-3	7.42	8.19	8.96	9.72	10.48	11.24	12.00	12.75	13.50	14.25	
	-4	7.35	8.11	8.88	9.65	10.41	11.16	11.92	12.67	13.42	14.17	
-300F	-5	7.27	8.04	8.81	9.57	10.33	11.09	11.84	12.60	13.35	14.10	
	-6	7.19	7.96	8.73	9.50	10.26	11.01	11.77	12.52	13.27	14.02	
	-7	7.11	7.88	8.65	9.42	10.18	10.94	11.69	12.45	13.20	13.95	
	-8	7.03	7.80	8.57	9.35	10.10	10.86	11.61	12.37	13.12	13.87	
	-9	6.95	7.73	8.50	9.27	10.03	10.79	11.54	12.30	13.05	13.80	
	°F	-200	-190	-180	-170	-160	-150	-140	-130	-120	-110	
	-0	15.22	15.96	16.69	17.43	18.17	18.90	19.64	20.37	21.10	21.82	
	-1	15.15	15.88	16.62	17.36	18.10	18.83	19.56	20.30	21.03	21.75	
	-2	15.07	15.81	16.55	17.28	18.02	18.75	19.49	20.22	20.96	21.68	
	-3	15.00	15.73	16.48	17.21	17.95	18.68	19.42	20.15	20.88	21.61	
	-4	14.92	15.66	16.40	17.13	17.88	18.61	19.35	20.08	20.81	21.53	
-200F	-5	14.85	15.58	16.33	17.06	17.80	18.54	19.27	20.00	20.74	21.46	
	-6	14.77	15.51	16.26	16.99	17.73	18.46	19.20	19.93	20.66	21.39	
	-7	14.70	15.44	16.18	16.91	17.65	18.39	19.12	19.86	20.59	21.32	
	-8	14.62	15.37	16.11	16.84	17.58	18.32	19.05	19.78	20.52	21.25	
	-9	14.55	15.29	16.04	16.76	17.50	18.24	18.98	19.71	20.44	21.17	
	°F	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0
	-0	22.56	23.28	24.00	24.73	25.44	26.16	26.88	27.59	23.31	29.02	29.73
	-1	22.49	23.21	23.93	24.66	25.37	26.09	26.81	27.52	28.24	28.95	29.66
	-2	22.41	23.14	23.86	24.58	25.30	26.02	26.74	27.45	28.16	28.88	29.59
	-3	22.34	23.06	23.79	24.51	25.23	25.95	26.66	27.38	28.09	28.80	29.52
	-4	22.27	22.99	23.71	24.44	25.15	25.87	26.59	27.30	28.02	28.73	29.45
-100F	-5	22.19	22.92	23.64	24.37	25.08	25.80	26.52	27.23	27.95	28.66	29.37
	-6	22.12	22.85	23.57	24.29	25.01	25.73	26.45	27.16	27.88	28.59	29.30
	-7	22.04	22.77	23.50	24.22	24.94	25.66	26.38	27.09	27.81	28.52	29.23
	-8	21.97	22.70	23.43	24.14	24.87	25.59	26.30	27.02	27.74	28.45	29.16
	-9	21.90	22.63	23.35	24.07	24.80	25.51	26.23	26.95	27.66	28.38	29.09
	°F	0	10	20	30	40	50	60	70	80	90	
	0	29.729	30.440	31.150	31.858	32.566	33.272	33.977	34.681	35.384	36.086	
	1	29.800	30.511	31.221	31.929	32.637	33.343	34.048	34.752	35.454	36.156	
	2	29.871	30.582	31.292	32.000	32.707	33.413	34.118	34.822	35.525	36.226	
	3	29.942	30.653	31.362	32.071	32.778	33.484	34.189	34.892	35.595	36.296	
	4	30.014	30.724	31.433	32.142	32.849	33.554	34.259	34.963	35.665	36.366	
0F	5	30.085	30.795	31.504	32.212	32.919	33.625	34.330	35.033	35.735	36.436	
	6	30.156	30.866	31.575	32.283	32.990	33.695	34.400	35.103	35.805	36.506	
	7	30.227	30.937	31.646	32.354	33.060	33.766	34.470	35.174	35.876	36.576	
	8	30.298	31.008	31.717	32.424	33.131	33.836	34.541	35.244	35.946	36.646	
	9	30.369	31.079	31.788	32.495	33.202	33.907	34.611	35.314	36.016	36.716	

TABLE I - FAHRENHEIT SCALE (Continued)

CLASS Q □□□□□□--B DETECTORS (32 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F	100	110	120	130	140	150	160	170	180	190
	0	36.786	37.486	38.184	38.881	39.577	40.272	40.965	41.658	42.349	43.039
	1	36.856	37.556	38.254	38.951	39.647	40.341	41.035	41.727	42.418	43.108
	2	36.926	37.626	38.324	39.020	39.716	40.411	41.104	41.796	42.487	43.177
	3	36.996	37.695	38.393	39.090	39.786	40.480	41.173	41.865	42.556	43.246
	4	37.066	37.765	38.463	39.160	39.855	40.549	41.243	41.935	42.625	43.315
100F											
	5	37.136	37.835	38.533	39.229	39.925	40.619	41.312	42.004	42.694	43.384
	6	37.206	37.905	38.602	39.299	39.994	40.688	41.381	42.073	42.763	43.453
	7	37.276	37.975	38.672	39.368	40.064	40.758	41.450	42.142	42.832	43.522
	8	37.346	38.045	38.742	39.438	40.133	40.827	41.520	42.211	42.901	43.591
	9	37.416	38.114	38.812	39.508	40.202	40.896	41.589	42.280	42.970	43.659
	°F	200	210	220	230	240	250	260	270	280	290
	0	43.728	44.416	45.103	45.788	46.473	47.156	47.838	48.519	49.199	49.877
	1	43.797	44.485	45.171	45.857	46.541	47.224	47.906	48.587	49.267	49.945
	2	43.866	44.554	45.240	45.925	46.609	47.292	47.974	48.655	49.334	50.013
	3	43.935	44.622	45.309	45.994	46.678	47.361	48.042	48.723	49.402	50.081
	4	44.004	44.691	45.377	46.062	46.746	47.429	48.110	48.791	49.470	50.148
200F											
	5	44.072	44.760	45.446	46.131	46.814	47.497	48.179	48.859	49.538	50.216
	6	44.141	44.828	45.514	46.199	46.883	47.565	48.247	48.927	49.606	50.284
	7	44.210	44.897	45.583	46.268	46.951	47.633	48.315	48.995	49.674	50.351
	8	44.279	44.966	45.651	46.336	47.019	47.702	48.383	49.063	49.742	50.419
	9	44.347	45.034	45.720	46.404	47.088	47.770	48.451	49.131	49.809	50.487
	°F	300	310	320	330	340	350	360	370	380	390
	0	50.555	51.231	51.906	52.580	53.253	53.924	54.595	55.264	55.932	56.599
	1	50.622	51.298	51.973	52.647	53.320	53.991	54.662	55.331	55.999	56.666
	2	50.690	51.366	52.041	52.715	53.387	54.059	54.729	55.398	56.066	56.733
	3	50.758	51.434	52.108	52.782	53.454	54.126	54.796	55.465	56.133	56.799
	4	50.825	51.501	52.176	52.849	53.522	54.193	54.863	55.532	56.199	56.866
300F											
	5	50.893	51.569	52.243	52.916	53.589	54.260	54.930	55.598	56.266	56.932
	6	50.960	51.636	52.310	52.984	53.656	54.327	54.997	55.665	56.333	56.999
	7	51.028	51.704	52.378	53.051	53.723	54.394	55.064	55.732	56.399	57.066
	8	51.096	51.771	52.445	53.118	53.790	54.461	55.130	55.799	56.466	57.132
	9	51.163	51.839	52.513	53.185	53.857	54.528	55.197	55.866	56.533	57.199
	°F	400	410	420	430	440	450	460	470	480	490
	0	57.265	57.930	58.593	59.256	59.917	60.577	61.236	61.894	62.551	63.206
	1	57.332	57.996	58.660	59.322	59.983	60.643	61.302	61.960	62.616	63.271
	2	57.398	58.063	58.726	59.388	60.049	60.709	61.368	62.025	62.682	63.337
	3	57.465	58.129	58.792	59.454	60.115	60.775	61.434	62.091	62.747	63.402
	4	57.531	58.196	58.859	59.521	60.181	60.841	61.499	62.157	62.813	63.468
400F											
	5	57.598	58.262	58.925	59.587	60.247	60.907	61.565	62.222	62.878	63.533
	6	57.664	58.328	58.991	59.653	60.313	60.973	61.631	62.288	62.944	63.599
	7	57.731	58.395	59.057	59.719	60.379	61.039	61.697	62.354	63.009	63.664
	8	57.797	58.461	59.123	59.785	60.445	61.104	61.762	62.419	63.075	63.730
	9	57.864	58.527	59.190	59.851	60.511	61.170	61.828	62.485	63.140	63.795

TABLE I - FAHRENHEIT SCALE (Continued)

CLASS Q □□□□□□--B DETECTORS (32 OHMS AT32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F	500	510	520	530	540	550	560	570	580	590
500F	0	63.860	64.513	65.165	65.816	66.466	67.114	67.762	68.408	69.053	69.697
	1	63.926	64.579	65.231	65.881	66.531	67.179	67.826	68.473	69.118	69.761
	2	63.991	64.644	65.296	65.946	66.596	67.244	67.891	68.537	69.182	69.826
	3	64.056	64.709	65.361	66.011	66.661	67.309	67.956	68.602	69.246	69.890
	4	64.122	64.774	65.426	66.076	66.725	67.374	68.020	68.666	69.311	69.954
	5	64.187	64.840	65.491	66.141	66.790	67.438	68.085	68.731	69.375	70.018
	6	64.252	64.905	65.556	66.206	66.855	67.503	68.150	68.795	69.440	70.083
	7	64.318	64.970	65.621	66.271	66.920	67.568	68.214	68.860	69.504	70.147
	8	64.383	65.035	65.686	66.336	66.985	67.637	68.279	68.924	69.568	70.211
	9	64.448	65.100	65.751	66.401	67.050	67.697	68.343	68.989	69.633	70.275
	°F	600	610	620	630	640	650	660	670	680	690
600F	0	70.340	70.981	71.622	72.261	72.899	73.536	74.172	74.807	75.440	76.072
	1	70.404	71.045	71.686	72.325	72.963	73.600	74.235	74.870	75.503	76.136
	2	70.468	71.109	71.750	72.389	73.027	73.663	74.299	74.933	75.567	76.199
	3	70.532	71.174	71.814	72.453	73.090	73.727	74.362	74.997	75.630	76.262
	4	70.596	71.238	71.878	72.516	73.154	73.791	74.426	75.060	75.693	76.325
	5	70.661	71.302	71.942	72.580	73.218	73.854	74.489	75.123	75.756	76.388
	6	70.725	71.366	72.005	72.644	73.281	73.918	74.553	75.187	75.820	76.451
	7	70.789	71.430	72.069	72.708	73.345	73.981	74.616	75.250	75.883	76.514
	8	70.853	71.494	72.133	72.772	73.409	74.045	74.680	75.313	75.946	76.577
	9	70.917	71.558	72.197	72.835	73.472	74.108	74.743	75.377	76.009	76.640
	°F	700	710	720	730	740	750	760	770	780	790
700F	0	76.704	77.334	77.962	78.590	79.217	79.842	80.466	81.089	81.711	82.332
	1	76.767	77.396	78.025	78.653	79.279	79.905	80.529	81.152	81.773	82.394
	2	76.830	77.459	78.088	78.716	79.342	79.967	80.591	81.214	81.836	82.456
	3	76.893	77.522	78.151	78.778	79.404	80.029	80.653	81.276	81.898	82.518
	4	76.956	77.585	78.214	78.841	79.467	80.092	80.716	81.338	81.960	82.580
	5	77.019	77.648	78.276	78.904	79.530	80.154	80.778	81.401	82.022	82.642
	6	77.082	77.711	78.339	78.966	79.592	80.217	80.840	81.463	82.084	82.704
	7	77.145	77.774	78.402	79.029	79.655	80.279	80.903	81.525	82.146	82.766
	8	77.208	77.837	78.465	79.091	79.717	80.342	80.965	81.587	82.208	82.828
	9	77.271	77.900	78.527	79.154	79.780	80.404	81.027	81.649	82.270	82.890
	°F	800	810	820	830	840	850	860	870	880	890
800F	0	82.952	83.570	84.188	84.804	85.419	86.033	86.645	87.257	87.867	88.476
	1	83.014	83.632	84.249	84.865	85.480	86.094	86.706	87.318	87.928	88.537
	2	83.076	83.694	84.311	84.927	85.542	86.155	86.768	87.379	87.989	88.598
	3	83.137	83.756	84.372	84.988	85.603	86.216	86.829	87.440	88.050	88.659
	4	83.200	83.817	84.434	85.050	85.664	86.278	86.890	87.501	88.111	88.720
	5	83.261	83.879	84.496	85.111	85.726	86.339	86.951	87.562	88.172	88.780
	6	83.323	83.941	84.557	85.173	85.787	86.400	87.012	87.623	88.233	88.841
	7	83.385	84.002	84.619	85.234	85.848	86.462	87.073	87.684	88.294	88.902
	8	83.447	84.064	84.681	85.296	85.910	86.523	87.135	87.745	88.355	88.963
	9	83.508	84.126	84.742	85.357	85.971	86.584	87.196	87.806	88.415	89.024

TABLE I - FAHRENHEIT SCALE (Continued)

CLASS Q □□□□□□--B DETECTORS (32 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F	900	910	920	930	940	950	960	970	980	990	
	0	89.084	89.691	90.297	90.902	91.505	92.107	92.708	93.308	93.907	94.505	
	1	89.145	89.752	90.358	90.962	91.565	92.167	92.769	93.368	93.967	94.565	
	2	89.206	89.813	90.418	91.022	91.626	92.228	92.829	93.428	94.027	94.624	
	3	89.267	89.873	90.479	91.083	91.686	92.288	92.889	93.488	94.087	94.684	
	4	89.327	89.934	90.539	91.143	91.746	92.348	92.949	93.548	94.146	94.744	
900F												
	5	89.388	89.994	90.599	91.203	91.806	92.408	93.009	93.608	94.206	94.803	
	6	89.449	90.055	90.660	91.264	91.867	92.468	93.069	93.668	94.266	94.863	
	7	89.509	90.115	90.720	91.324	91.927	92.528	93.129	93.728	94.326	94.923	
	8	89.570	90.176	90.781	91.384	91.987	92.588	93.189	93.788	94.385	94.982	
	9	89.631	90.237	90.841	91.445	92.047	92.648	93.248	93.847	94.445	95.042	
	°F	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	
	0	95.101	95.697	96.291	96.884	97.476	98.067	98.656	99.245	99.832	100.418	
	1	95.161	95.756	96.350	96.943	97.535	98.126	98.715	99.303	99.890	100.476	
	2	95.221	95.816	96.410	97.002	97.594	98.185	98.774	99.362	99.949	100.535	
	3	95.280	95.875	96.469	97.062	97.653	98.244	98.833	99.421	100.008	100.593	
	4	95.340	95.935	96.528	97.121	97.712	98.303	98.892	99.480	100.066	100.652	
1000F												
	5	95.399	95.994	96.588	97.180	97.771	98.361	98.950	99.538	100.125	100.710	
	6	95.459	96.053	96.647	97.239	97.830	98.420	99.009	99.597	100.184	100.769	
	7	95.518	96.113	96.706	97.298	97.889	98.479	99.068	99.656	100.242	100.827	
	8	95.578	96.172	96.765	97.358	97.948	98.538	99.127	99.714	100.301	100.886	
	9	95.637	96.232	96.825	97.417	98.008	98.597	99.186	99.773	100.359	100.944	
	°F	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190	1200
	0	101.003	101.587	102.169	102.751	103.331	103.910	104.488	105.065	106.641	106.215	106.789
	1	101.061	101.645	102.227	102.809	103.389	103.968	104.546	105.123	105.698	106.273	
	2	101.120	101.703	102.286	102.867	103.447	104.026	104.604	105.180	105.756	106.330	
	3	101.178	101.761	102.344	102.925	103.505	104.084	104.661	105.238	105.813	106.387	
	4	101.236	101.820	102.402	102.983	103.563	104.141	104.719	105.295	105.871	106.445	
1100F												
	5	101.295	101.878	102.460	103.041	103.621	104.199	104.777	105.353	105.928	106.502	
	6	101.353	101.936	102.518	103.099	103.679	104.257	104.834	105.411	105.986	106.559	
	7	101.412	101.995	102.576	103.157	103.737	104.315	104.892	105.468	106.043	106.617	
	8	101.470	102.053	102.634	103.215	103.794	104.373	104.950	105.526	106.100	106.674	
	9	101.528	102.111	102.693	103.273	103.852	104.430	105.008	105.583	106.158	106.731	

TABLE I - CENTIGRADE SCALE

CLASS Q □□□□□□--B DETECTORS (32 OHMS AT 0C)

Temperature vs Resistance Values in Ohms at 1C Intervals

	°C										
						-250	-240	-230	-220	-210	
	0					.300	.832	1.720	2.861	4.146	
	-1					.269	.763	1.619	2.739	4.014	
	-2					.238	.695	1.519	2.617	3.882	
	-3					.213	.634	1.423	2.499	3.751	
	-4					.189	.573	1.328	2.382	3.620	
-250C	-5					.171	.520	1.238	2.267	3.491	
	-6					.153	.467	1.149	2.153	3.363	
	-7					.139	.421	1.066	2.042	3.236	
	-8					.125	.376	.984	1.932	3.109	
	-9					.116	.338	.908	1.826	2.985	
	°C	-200	-190	-180	-170	-160	-150	-140	-130	-120	-110
	0	5.501	6.880	8.269	9.645	11.013	12.372	13.726	15.066	16.402	17.732
	-1	5.364	6.741	8.130	9.507	10.876	12.236	13.589	14.932	16.269	17.599
	-2	5.227	6.603	7.992	9.370	10.740	12.101	13.453	14.798	16.135	17.466
	-3	5.090	6.465	7.853	9.232	10.603	11.965	13.318	14.663	16.001	17.333
	-4	4.954	6.327	7.714	9.095	10.466	11.829	13.183	14.529	15.868	17.200
-200C	-5	4.818	6.188	7.575	8.957	10.329	11.693	13.048	14.396	15.734	17.067
	-6	4.683	6.050	7.436	8.819	10.193	11.557	12.914	14.264	15.601	16.934
	-7	4.548	5.912	7.297	8.681	10.056	11.421	12.778	14.128	15.467	16.801
	-8	4.413	5.775	7.158	8.544	9.919	11.285	12.642	13.992	15.334	16.668
	-9	4.279	5.638	7.019	8.406	9.782	11.149	12.507	13.859	15.200	16.535
	°C	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	0
	0	19.055	20.371	21.682	22.988	24.289	25.585	26.876	28.163	29.446	30.726	32.000
	-1	18.922	20.239	21.551	22.857	24.169	25.455	26.747	28.034	29.318	30.598	31.872
	-2	18.790	20.108	21.420	22.727	24.029	25.326	26.618	27.905	29.189	30.470	31.745
	-3	18.657	19.976	21.289	22.596	23.899	25.196	26.489	27.777	29.061	30.342	31.617
	-4	18.525	19.844	21.158	22.466	23.769	25.066	26.366	27.648	28.933	30.214	31.490
-100C	-5	18.393	19.712	21.027	22.335	23.638	24.986	26.230	27.520	28.804	30.086	31.363
	-6	18.261	19.581	20.896	22.205	23.508	24.807	26.101	27.391	28.676	29.958	31.235
	-7	18.128	19.449	20.765	22.074	23.378	24.727	25.972	27.262	28.548	29.830	31.108
	-8	17.996	19.318	20.634	21.944	23.248	24.548	25.843	27.134	28.419	29.702	30.981
	-9	17.864	19.186	20.502	21.813	23.118	24.418	25.714	27.005	28.291	29.574	30.853
	°C	0	10	20	30	40	50	60	70	80	90	
	0	32.000	33.272	34.541	35.805	37.066	38.324	39.577	40.827	42.073	43.315	
	1	32.127	33.399	34.667	35.932	37.192	38.449	39.702	40.952	42.197	43.439	
	2	32.255	33.526	34.794	36.058	37.318	38.575	39.827	41.076	42.322	43.563	
	3	32.382	33.653	34.920	36.184	37.444	38.700	39.952	41.201	42.446	43.687	
	4	32.509	33.780	35.047	36.310	37.570	38.825	40.077	41.326	42.570	43.811	
0C	5	32.637	33.907	35.174	36.436	37.695	38.951	40.202	41.450	42.694	43.935	
	6	32.764	34.034	35.300	36.562	37.821	39.076	40.327	41.575	42.819	44.059	
	7	32.891	34.161	35.426	36.688	37.947	39.201	40.452	41.699	42.943	44.182	
	8	33.018	34.287	35.553	36.814	38.072	39.327	40.577	41.824	43.067	44.306	
	9	33.145	34.414	35.679	36.940	38.198	39.452	40.702	41.948	43.191	44.430	
	°C	100	110	120	130	140	150	160	170	180	190	
	0	44.554	45.788	47.019	48.247	49.470	50.690	51.906	53.118	54.327	55.532	
	1	44.677	45.912	47.142	48.369	49.592	50.812	52.027	53.239	54.447	55.652	
	2	44.801	46.035	47.265	48.492	49.714	50.933	52.149	53.360	54.568	55.772	
	3	44.924	46.158	47.388	48.614	49.836	51.055	52.270	53.481	54.689	55.892	
	4	45.048	46.281	47.511	48.736	49.959	51.177	52.391	53.602	54.809	56.012	
100C	5											
	5	45.171	46.404	47.633	48.859	50.081	51.298	52.513	53.723	54.930	56.133	
	6	45.295	46.527	47.756	48.981	50.202	51.420	52.634	53.844	55.050	56.253	
	7	45.418	46.650	47.879	49.103	50.324	51.542	52.755	53.965	55.171	56.373	
	8	45.542	46.773	48.001	49.226	50.446	51.663	52.876	54.085	55.291	56.493	
	9	45.665	46.896	48.124	49.348	50.568	51.785	52.997	54.206	55.411	56.613	

TABLE I - CENTIGRADE SCALE (Continued)

CLASS Q □□□□□□--B DETECTORS (32 OHMS AT 0C)

Temperature vs Resistance Values in Ohms at 1C Intervals

	°C	200	210	220	230	240	250	260	270	280	290
200C	0	56.733	57.930	59.123	60.313	61.499	62.682	63.860	65.035	66.206	67.374
	1	56.853	58.049	59.243	60.432	61.618	62.800	63.978	65.152	66.323	67.490
	2	56.972	58.169	59.362	60.551	61.736	62.918	64.096	65.270	66.440	67.607
	3	57.092	58.288	59.481	60.670	61.854	63.036	64.213	65.387	66.557	67.723
	4	57.212	58.408	59.600	60.788	61.973	63.154	64.331	65.504	66.674	67.839
	5	57.332	58.527	59.719	60.907	62.091	63.271	64.448	65.621	66.790	67.956
	6	57.451	58.647	59.838	61.025	62.209	63.389	64.566	65.738	66.907	68.072
	7	57.571	58.766	59.957	61.144	62.327	63.507	64.683	65.855	67.024	68.188
	8	57.691	58.885	60.076	61.262	62.446	63.625	64.800	65.972	67.140	68.305
	9	57.810	59.004	60.194	61.381	62.564	63.743	64.918	66.089	67.257	68.421
	°C	300	310	320	330	340	350	360	370	380	390
300C	0	68.537	69.697	70.853	72.005	73.154	74.299	75.440	76.577	77.711	78.841
	1	68.653	69.813	70.968	72.120	73.269	74.413	75.554	76.691	77.824	78.954
	2	68.769	69.928	71.084	72.235	73.383	74.527	75.668	76.804	77.937	79.066
	3	68.885	70.044	71.199	72.350	73.498	74.642	75.782	76.918	78.050	79.179
	4	69.001	70.160	71.314	72.465	73.612	74.756	75.895	77.031	78.163	79.292
	5	69.117	70.275	71.430	72.580	73.727	74.870	76.009	77.145	78.276	79.404
	6	69.233	70.391	71.545	72.695	73.841	74.984	76.123	77.258	78.389	79.517
	7	69.349	70.507	71.660	72.810	73.956	75.098	76.237	77.371	78.502	79.630
	8	69.465	70.622	71.775	72.925	74.070	75.212	76.350	77.485	78.615	79.742
	9	69.581	70.738	71.890	73.039	74.185	75.326	76.464	77.598	78.728	79.855
	°C	400	410	420	430	440	450	460	470	480	490
400C	0	79.967	81.089	82.208	83.323	84.434	85.542	86.645	87.745	88.841	89.934
	1	80.079	81.201	82.320	83.434	84.545	85.652	86.755	87.855	88.951	90.043
	2	80.192	81.313	82.431	83.546	84.656	85.763	86.865	87.965	89.060	90.152
	3	80.304	81.425	82.543	83.657	84.767	85.873	86.976	88.074	89.169	90.261
	4	80.416	81.537	82.654	83.768	84.878	85.983	87.086	88.184	89.279	90.370
	5	80.529	81.649	82.766	83.879	84.988	86.094	87.196	88.294	89.388	90.479
	6	80.641	81.761	82.877	83.990	85.099	86.204	87.306	88.403	89.497	90.587
	7	80.753	81.873	82.989	84.101	85.210	86.314	87.416	88.513	89.606	90.696
	8	80.865	81.985	83.100	84.212	85.320	86.425	87.525	88.622	89.716	90.805
	9	80.977	82.096	83.212	84.323	85.431	86.535	87.635	88.732	89.825	90.914
	°C	500	510	520	530	540	550	560	570	580	590
500C	0	91.022	92.107	93.189	94.266	95.340	96.410	97.476	98.538	99.597	100.652
	1	91.131	92.216	93.296	94.374	95.447	96.516	97.582	98.644	99.703	100.757
	2	91.240	92.324	93.404	94.481	95.554	96.623	97.689	98.750	99.808	100.863
	3	91.348	92.432	93.512	94.588	95.661	96.730	97.795	98.856	99.914	100.968
	4	91.457	92.540	93.620	94.696	95.768	96.837	97.901	98.962	100.019	101.073
	5	91.565	92.648	93.728	94.803	95.875	96.943	98.008	99.068	100.125	101.178
	6	91.674	92.757	93.835	94.911	95.982	97.050	98.114	99.174	100.230	101.283
	7	91.782	92.865	93.943	95.018	96.089	97.156	98.220	99.280	100.336	101.388
	8	91.891	92.973	94.051	95.125	96.196	97.263	98.326	99.386	100.441	101.493
	9	91.999	93.081	94.158	95.232	96.303	97.369	98.432	99.491	100.547	101.598
	°C	600	610	620	630	640	650				
600C	0	101.703	102.751	103.794	104.834	105.871	106.903				
	1	101.808	102.855	103.899	104.938	105.974					
	2	101.913	102.960	104.003	105.042	106.077					
	3	102.018	103.064	104.107	105.146	106.181					
	4	102.123	103.169	104.211	105.249	106.284					
	5	102.227	103.272	104.315	105.353	106.387					
	6	102.332	103.377	104.419	105.457	106.491					
	7	102.437	103.482	104.523	105.560	106.594					
	8	102.542	103.586	104.627	105.664	106.697					
	9	102.646	103.690	104.731	105.767	106.800					

TABLE II - FAHRENHEIT SCALE

CLASS Q □□□□□□--C DETECTORS (10 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F	-400	-390	-380	-370	-360	-350	-340	-330	-320	-310	
	0	.260	.403	.575	.768	.981	1.204	1.435	1.671	1.910	2.150	
	-1		.387	.556	.748	.959	1.181	1.412	1.647	1.886	2.126	
	-2		.371	.538	.728	.937	1.158	1.388	1.624	1.862	2.102	
	-3		.356	.520	.708	.916	1.136	1.365	1.600	1.838	2.078	
	-4		.341	.503	.689	.894	1.113	1.342	1.577	1.815	2.053	
-400F												
	-5		.327	.485	.669	.873	1.091	1.319	1.553	1.791	2.030	
	-6		.314	.468	.650	.852	1.069	1.296	1.529	1.767	2.006	
	-7		.300	.452	.630	.831	1.047	1.273	1.506	1.743	1.982	
	-8		.287	.435	.611	.810	1.024	1.249	1.482	1.719	1.958	
	-9		.273	.418	.593	.788	1.000	1.227	1.458	1.695	1.934	
	°F	-300	-290	-280	-270	-260	-250	-240	-230	-220	-210	
	0	2.391	2.632	2.871	3.110	3.346	3.583	3.819	4.055	4.289	4.522	
	-1	2.367	2.608	2.846	3.086	3.323	3.560	3.796	4.031	4.266	4.499	
	-2	2.343	2.584	2.823	3.062	3.299	3.536	3.772	4.007	4.242	4.476	
	-3	2.319	2.560	2.799	3.038	3.276	3.512	3.749	3.984	4.218	4.452	
	-4	2.295	2.536	2.775	3.014	3.252	3.489	3.725	3.960	4.195	4.429	
-300F												
	-5	2.270	2.512	2.751	2.990	3.228	3.465	3.702	3.937	4.171	4.406	
	-6	2.247	2.488	2.727	2.966	3.204	3.442	3.678	3.913	4.148	4.382	
	-7	2.222	2.464	2.703	2.942	3.180	3.413	3.654	3.889	4.125	4.359	
	-8	2.198	2.440	2.680	2.918	3.157	3.394	3.631	3.866	4.101	4.336	
	-9	2.174	2.416	2.656	2.895	3.133	3.370	3.607	3.843	4.078	4.312	
	°F	-200	-190	-180	-170	-160	-150	-140	-130	-120	-110	
	0	4.755	4.986	5.218	5.450	5.679	5.908	6.137	6.366	6.594	6.822	
	-1	4.731	4.964	5.195	5.426	5.656	5.886	6.114	6.343	6.571	6.799	
	-2	4.708	4.940	5.172	5.403	5.633	5.863	6.092	6.320	6.548	6.776	
	-3	4.685	4.917	5.149	5.380	5.610	5.839	6.069	6.298	6.525	6.753	
	-4	4.661	4.894	5.126	5.356	5.588	5.816	6.046	6.275	6.503	6.730	
-200F												
	-5	4.638	4.870	5.103	5.333	5.564	5.794	6.023	6.252	6.480	6.708	
	-6	4.615	4.847	5.079	5.310	5.541	5.771	6.000	6.229	6.457	6.685	
	-7	4.593	4.824	5.056	5.287	5.518	5.748	5.978	6.205	6.434	6.662	
	-8	4.568	4.801	5.033	5.264	5.495	5.725	5.955	6.183	6.412	6.639	
	-9	4.545	4.778	5.009	5.240	5.472	5.702	6.932	6.160	6.389	6.617	
	°F	-100	-90	-80	-70	-60	-50	-40	-30	-20	-10	-0
	0	7.048	7.274	7.500	7.722	7.950	8.175	8.399	8.622	8.845	9.071	9.291
	-1	7.025	7.251	7.478	7.715	7.928	8.152	8.376	8.600	8.823	9.047	9.269
	-2	7.003	7.229	7.455	7.683	7.905	8.130	8.354	8.578	8.801	9.024	9.246
	-3	6.980	7.206	7.432	7.658	7.883	8.107	8.331	8.555	8.779	9.001	9.224
	-4	6.957	7.184	7.410	7.635	7.860	8.085	8.309	8.533	8.756	8.979	9.202
-100F												
	-5	6.934	7.161	7.387	7.613	7.838	8.063	8.287	8.510	8.734	8.957	9.180
	-6	6.912	7.138	7.364	7.590	7.822	8.040	8.265	8.488	8.711	8.934	9.158
	-7	6.889	7.116	7.342	7.569	7.808	8.018	8.243	8.466	8.687	8.912	9.135
	-8	6.866	7.093	7.319	7.548	7.777	7.995	8.217	8.443	8.665	8.890	9.114
	-9	6.844	7.070	7.297	7.524	7.747	7.973	8.197	8.421	8.644	8.868	9.094

TABLE II - FAHRENHEIT SCALE (Continued)

CLASS Q □□□□□□--C DETECTORS (10 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F	0	10	20	30	40	50	60	70	80	90
0F	0	9.290	9.512	9.734	9.956	10.177	10.398	10.618	10.838	11.058	11.277
	1	9.313	9.535	9.756	9.978	10.199	10.420	10.640	10.860	11.080	11.299
	2	9.335	9.557	9.779	10.000	10.221	10.442	10.662	10.882	11.101	11.321
	3	9.357	9.579	9.801	10.022	10.243	10.464	10.684	10.904	11.123	11.343
	4	9.379	9.601	9.823	10.044	10.265	10.486	10.706	10.926	11.145	11.364
	5	9.401	9.623	9.845	10.066	10.287	10.508	10.728	10.948	11.167	11.386
	6	9.424	9.646	9.867	10.088	10.309	10.530	10.750	10.970	11.189	11.408
	7	9.446	9.668	9.889	10.111	10.331	10.552	10.772	10.992	11.211	11.430
	8	9.468	9.690	9.911	10.133	10.353	10.574	10.794	11.014	11.233	11.452
	9	9.490	9.712	9.934	10.155	10.376	10.596	10.816	11.036	11.255	11.474
	°F	100	110	120	130	140	150	160	170	180	190
100F	0	11.496	11.714	11.933	12.150	12.368	12.585	12.802	13.018	13.234	13.450
	1	11.518	11.736	11.954	12.172	12.390	12.607	12.823	13.040	13.256	13.471
	2	11.540	11.758	11.976	12.194	12.411	12.628	12.845	13.061	13.277	13.493
	3	11.561	11.780	11.998	12.216	12.433	12.650	12.867	13.083	13.299	13.514
	4	11.583	11.802	12.020	12.237	12.455	12.672	12.888	13.105	13.320	13.536
	5	11.605	11.823	12.041	12.259	12.476	12.693	12.910	13.126	13.342	13.557
	6	11.627	11.845	12.063	12.281	12.498	12.715	12.932	13.148	13.364	13.579
	7	11.649	11.867	12.085	12.303	12.520	12.737	12.953	13.169	13.385	13.601
	8	11.671	11.889	12.107	12.324	12.542	12.758	12.975	13.191	13.407	13.622
	9	11.692	11.911	12.129	12.346	12.563	12.780	12.996	13.213	13.428	13.644
	°F	200	210	220	230	240	250	260	270	280	290
200F	0	13.665	13.880	14.095	14.309	14.523	14.736	14.949	15.162	15.375	15.587
	1	13.687	13.902	14.116	14.330	14.544	14.758	14.971	15.183	15.396	15.608
	2	13.708	13.923	14.138	14.352	14.565	14.779	14.992	15.205	15.417	15.629
	3	13.730	13.944	14.159	14.373	14.587	14.800	15.013	15.226	15.438	15.650
	4	13.751	13.966	14.180	14.394	14.608	14.822	15.035	15.247	15.459	16.671
	5	13.773	13.987	14.202	14.416	14.630	14.843	15.056	15.268	15.481	15.693
	6	13.794	14.009	14.223	14.437	14.651	14.864	15.077	15.290	15.502	15.714
	7	13.816	14.030	14.245	14.459	14.672	14.885	15.098	15.311	15.523	15.735
	8	13.837	14.052	14.266	14.480	14.694	14.907	15.120	15.332	15.544	15.756
	9	13.859	14.073	14.287	14.501	14.715	14.928	15.141	15.353	15.565	15.777
	°F	300	310	320	330	340	350	360	370	380	390
300F	0	15.798	16.010	16.221	16.431	16.641	16.851	17.061	17.270	17.479	17.687
	1	15.819	16.031	16.243	16.452	16.662	16.872	17.082	17.291	17.500	17.708
	2	15.841	16.052	16.263	16.473	16.683	16.893	17.103	17.312	17.521	17.729
	3	15.862	16.073	16.284	16.494	16.704	16.914	17.124	17.333	17.541	17.750
	4	15.883	16.094	16.305	16.515	16.725	16.935	17.145	17.354	17.562	17.771
	5	15.904	16.115	16.326	16.536	16.746	16.956	17.166	17.375	17.583	17.791
	6	15.925	16.136	16.347	16.557	16.767	16.977	17.186	17.395	17.604	17.812
	7	15.946	16.157	16.368	16.578	16.788	16.998	17.207	17.416	17.625	18.833
	8	15.967	16.178	16.389	16.599	16.809	17.019	17.228	17.437	17.646	17.854
	9	15.989	16.200	16.410	16.620	16.830	17.040	17.249	17.458	17.666	17.875

TABLE II - FAHRENHEIT SCALE (Continued)

CLASS Q □□□□□□--C DETECTORS (10 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F	400	410	420	430	440	450	460	470	480	490
400F	0	17.895	18.103	18.310	18.517	18.724	18.930	19.136	19.342	19.547	19.752
	1	17.916	18.124	18.331	18.538	18.745	18.951	19.157	19.362	19.568	19.772
	2	17.937	18.145	18.352	18.559	18.765	18.972	19.177	19.383	19.588	19.793
	3	17.958	18.165	18.373	18.579	18.786	18.992	19.198	19.403	19.609	19.813
	4	17.979	18.186	18.393	18.600	18.807	19.013	19.219	19.424	19.629	19.834
	5	17.999	18.207	18.414	18.621	18.827	19.033	19.239	19.444	19.649	19.854
	6	18.020	18.228	18.435	18.641	18.848	19.054	19.260	19.465	19.670	19.875
	7	18.041	18.248	18.455	18.662	18.869	19.075	19.280	19.486	19.690	19.895
	8	18.062	18.269	18.476	18.683	18.889	19.095	19.301	19.506	19.711	19.915
	9	18.082	18.290	18.497	18.703	18.910	19.116	19.321	19.527	19.731	19.936
	°F	500	510	520	530	540	550	560	570	580	590
500F	0	19.956	20.160	20.364	20.568	20.771	20.973	21.176	21.378	21.579	21.780
	1	19.977	20.181	20.385	20.588	20.791	20.994	21.196	21.398	21.599	21.800
	2	19.997	20.201	20.405	20.608	20.811	21.014	21.216	21.418	21.619	21.820
	3	20.018	20.222	20.425	20.628	20.831	21.034	21.236	21.438	21.639	21.840
	4	20.038	20.242	20.446	20.649	20.852	21.054	21.256	21.458	21.660	21.860
	5	20.058	20.262	20.466	20.669	20.872	21.074	21.277	21.478	21.680	21.880
	6	20.079	20.283	20.486	20.689	20.892	21.095	21.297	21.498	21.700	21.900
	7	20.099	20.303	20.507	20.710	20.912	21.115	21.317	21.519	21.720	21.920
	8	20.120	20.323	20.527	20.730	20.933	21.135	21.337	21.539	21.740	21.941
	9	20.140	20.344	20.547	20.750	20.953	21.155	21.357	21.559	21.760	21.961
	°F	600	610	620	630	640	650	660	670	680	690
600F	0	21.981	22.182	22.382	22.582	22.781	22.980	23.180	23.380	23.575	23.773
	1	22.001	22.202	22.402	22.602	22.801	23.000	23.200	23.400	23.595	23.792
	2	22.021	22.222	22.422	22.621	22.821	23.020	23.220	23.417	23.615	23.812
	3	22.041	22.242	22.442	22.641	22.841	23.040	23.240	23.436	23.634	23.832
	4	22.061	22.262	22.462	22.661	22.861	23.060	23.260	23.456	23.654	23.852
	5	22.081	22.282	22.482	22.681	22.881	23.080	23.280	23.476	23.674	23.871
	6	22.101	22.302	22.502	22.701	22.900	23.100	23.300	23.496	23.694	23.891
	7	22.122	22.322	22.522	22.721	22.920	23.120	23.320	23.516	23.713	23.911
	8	22.142	22.342	22.542	22.741	22.940	23.140	23.340	23.535	23.733	23.930
	9	22.162	22.362	22.612	22.761	22.960	23.160	23.360	23.555	23.753	23.950
	°F	700	710	720	730	740	750	760	770	780	790
700F	0	23.970	24.167	24.363	24.560	24.755	24.951	25.146	25.340	25.535	25.729
	1	23.990	24.186	24.383	24.580	24.775	24.970	25.165	25.360	25.554	25.748
	2	24.009	24.206	24.403	24.600	24.794	24.990	25.185	25.379	25.574	25.767
	3	24.029	24.226	24.422	24.618	24.814	25.009	25.204	25.399	25.593	25.787
	4	24.049	24.245	24.442	24.638	24.833	25.029	25.224	25.418	25.612	25.806
	5	24.068	24.265	24.461	24.657	24.853	25.048	25.243	25.438	25.632	25.826
	6	24.088	24.285	24.481	24.677	24.873	25.068	25.263	25.457	25.651	25.845
	7	24.108	24.304	24.501	24.697	24.892	25.087	25.282	25.477	25.671	25.864
	8	24.127	24.324	24.520	24.716	24.912	25.107	25.302	25.496	25.690	25.884
	9	24.147	24.344	24.540	24.736	24.931	25.126	25.321	25.515	25.709	25.903

TABLE II - FAHRENHEIT SCALE (Continued)

CLASS Q □□□□□□--C DETECTORS (10 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 1F Intervals

	°F	800	810	820	830	840	850	860	870	880	890
800F	0	25.922	26.116	26.309	26.501	26.693	26.885	27.077	27.268	27.458	27.649
	1	25.942	26.135	26.328	26.520	26.713	26.904	27.096	27.287	27.478	27.668
	2	25.961	26.154	26.347	26.540	26.732	26.923	27.115	27.306	27.497	27.687
	3	25.980	26.174	26.366	26.559	26.751	26.943	27.134	27.325	27.516	27.706
	4	26.000	26.193	26.386	26.578	26.770	26.962	27.153	27.344	27.535	27.725
	5	26.019	26.212	26.405	26.597	26.789	26.981	27.172	27.363	27.554	27.744
	6	26.038	26.231	26.424	26.617	26.808	27.000	27.191	27.382	27.573	27.763
	7	26.058	26.251	26.443	26.636	26.828	27.019	27.210	27.401	27.592	27.782
	8	26.077	26.270	26.463	26.655	26.847	27.038	27.230	27.420	27.611	27.801
	9	26.096	26.289	26.482	26.674	26.866	27.057	27.249	27.439	27.630	27.820

	°F	900	910	920	930	940	950	960	970	980	990
900F	0	27.839	28.029	28.218	28.407	28.595	28.784	28.971	29.159	29.346	29.533
	1	27.858	28.047	28.237	28.426	28.614	28.802	28.990	29.178	29.365	29.551
	2	27.877	28.066	28.256	28.445	28.633	28.821	29.009	29.196	29.383	29.570
	3	27.896	28.085	28.275	28.463	28.652	28.840	29.028	29.215	29.402	29.589
	4	27.915	28.104	28.293	28.482	28.671	28.859	29.046	29.234	29.421	29.607
	5	27.934	28.123	28.312	28.501	28.689	28.878	29.065	29.252	29.439	29.626
	6	27.953	28.142	28.331	28.520	28.708	28.896	29.084	29.271	29.458	29.645
	7	27.972	28.161	28.350	28.539	28.727	28.915	29.103	29.290	29.476	29.663
	8	27.991	28.180	28.369	28.558	28.746	28.934	29.121	29.309	29.495	29.682
	9	28.010	28.199	28.388	28.576	28.765	28.953	29.140	29.327	29.514	29.701

	°F	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090
1000F	0	29.719	29.905	30.091	30.276	30.461	30.646	30.830	31.014	31.197	31.381
	1	29.738	29.924	30.109	30.295	30.480	30.664	30.848	31.032	31.216	31.399
	2	29.756	29.942	30.128	30.313	30.498	30.683	30.867	31.051	31.234	31.417
	3	29.775	29.961	30.147	30.332	30.517	30.701	30.885	31.069	31.252	31.435
	4	29.794	29.980	30.165	30.350	30.535	30.720	30.904	31.087	31.271	31.454
	5	29.812	29.998	30.184	30.369	30.554	30.738	30.922	31.106	31.289	31.472
	6	29.831	30.017	30.202	30.387	30.572	30.756	30.940	31.124	31.307	31.490
	7	29.849	30.035	30.221	30.406	30.590	30.775	30.959	31.142	31.326	31.509
	8	29.868	30.054	30.239	30.424	30.609	30.793	30.977	31.161	31.344	31.527
	9	29.887	30.072	30.258	30.443	30.627	30.812	31.000	31.179	31.362	31.545

	°F	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
1100F	0	31.563	31.746	31.928	32.110	32.291	32.472	32.653	32.833	33.013	33.192
	1	31.582	31.764	31.946	32.128	32.309	32.490	32.671	32.851	33.031	33.210
	2	31.600	31.782	31.964	32.146	32.327	32.508	32.689	32.869	33.049	33.228
	3	31.618	31.800	31.982	32.164	32.345	32.526	32.707	32.887	33.067	33.246
	4	31.636	31.819	32.000	32.182	32.363	32.544	32.725	32.905	33.085	33.264
	5	31.655	31.837	32.019	32.200	32.381	32.562	32.743	32.923	33.103	33.282
	6	31.673	31.855	32.037	32.218	32.400	32.580	32.761	32.941	33.120	33.300
	7	31.691	31.873	32.055	32.237	32.418	32.598	32.779	32.956	33.138	33.318
	8	31.709	31.892	32.073	32.255	32.436	32.616	32.797	32.977	33.156	33.336
	9	31.728	31.910	32.091	32.273	32.454	32.635	32.815	32.995	33.174	33.354

	°F	1200
1200F	0	33.37

TABLE II - CENTIGRADE SCALE

CLASS Q □□□□□□--C DETECTORS (10 OHMS AT 0C)

Temperature vs Resistance Values in Ohms at 1C Intervals

	°C	-250	-240	-230	-220	-210	-200	-190	-180	-170	-160
-250C	0	.0938	.260	.538	.894	1.296	1.719	2.150	2.584	3.014	3.442
	-1	.0841	.238	.506	.856	1.254	1.676	2.107	2.541	2.971	3.399
	-2	.0744	.217	.475	.818	1.213	1.633	2.063	2.498	2.928	3.356
	-3	.0666	.198	.445	.780	1.172	1.591	2.020	2.454	2.885	3.313
	-4	.0591	.179	.415	.744	1.131	1.548	1.977	2.411	2.842	3.271
	-5	.0534	.163	.387	.708	1.091	1.506	1.934	2.367	2.799	3.228
	-6	.0478	.146	.359	.673	1.051	1.463	1.891	2.324	2.756	3.185
	-7	.0434	.132	.333	.638	1.011	1.421	1.848	2.280	2.713	3.143
	-8	.0391	.116	.308	.604	.972	1.379	1.805	2.237	2.670	3.100
	-9	.0363	.106	.284	.571	.933	1.337	1.762	2.193	2.627	3.057

	°C	-150	-140	-130	-120	-110	-100	-90	-80	-70	-60
-150C	0	3.866	4.289	4.708	5.126	5.541	5.955	6.366	6.776	7.184	7.590
	-1	3.824	4.247	4.666	5.084	5.500	5.913	6.325	6.735	7.143	7.553
	-2	3.782	4.204	4.624	5.042	5.458	5.872	6.284	6.694	7.102	7.509
	-3	3.739	4.162	4.582	5.000	5.417	5.830	6.243	6.653	7.061	7.468
	-4	3.697	4.120	4.540	4.959	5.375	5.789	6.201	6.612	7.021	7.428
	-5	3.654	4.078	4.499	4.917	5.333	5.748	6.160	6.571	6.980	7.387
	-6	3.612	4.036	4.457	4.875	5.292	5.707	6.119	6.530	6.939	7.346
	-7	3.569	3.993	4.415	4.833	5.250	5.665	6.078	6.489	6.898	7.306
	-8	3.527	3.951	4.373	4.792	5.209	5.624	6.037	6.448	6.858	7.265
	-9	3.484	3.908	4.331	4.750	5.167	5.583	5.996	6.407	6.817	7.224

	°C	-50	-40	-30	-20	-10	0
-50C	0	7.995	8.399	8.801	9.202	9.602	10.000
	-1	7.955	8.358	8.761	9.162	9.562	9.960
	-2	7.914	8.318	8.720	9.122	9.522	9.920
	-3	7.874	8.278	8.678	9.086	9.482	9.880
	-4	7.833	8.239	8.640	9.042	9.442	9.841
	-5	7.808	8.197	8.600	9.001	9.402	9.801
	-6	7.752	8.157	8.560	8.961	9.362	9.761
	-7	7.727	8.116	8.519	8.921	9.322	9.721
	-8	7.671	8.076	8.479	8.881	9.282	9.682
	-9	7.631	8.036	8.439	8.841	9.242	9.642

	°C	0	10	20	30	40	50	60	70	80	90
0C	0	10.000	10.398	10.794	11.189	11.583	11.976	12.368	12.758	13.148	13.536
	1	10.040	10.437	10.834	11.229	11.623	12.015	12.407	12.797	13.187	13.575
	2	10.080	10.477	10.873	11.268	11.662	12.055	12.446	12.836	13.225	13.613
	3	10.120	10.517	10.913	11.308	11.701	12.094	12.485	12.875	13.264	13.652
	4	10.159	10.556	10.952	11.347	11.741	12.133	12.524	12.914	13.303	13.691
	5	10.199	10.596	10.992	11.386	11.780	12.172	12.563	12.953	13.342	13.730
	6	10.239	10.636	11.031	11.426	11.819	12.211	12.602	12.992	13.381	13.768
	7	10.278	10.675	11.071	11.465	11.858	12.250	12.641	13.031	13.420	13.807
	8	10.318	10.715	11.110	11.505	11.898	12.290	12.680	13.070	13.458	13.846
	9	10.358	10 754	11.150	11.544	11.937	12.329	12.719	13.109	13.497	13.884

	°C	100	110	120	130	140	150	160	170	180	190
100C	0	13.923	14.309	14.694	15.077	15.459	15.841	16.221	16.599	16.977	17.354
	1	13.962	14.347	14.732	15.115	15.498	15.879	16.259	16.637	17.015	17.391
	2	14.000	14.386	14.770	15.154	15.536	15.917	16.296	16.675	17.053	17.429
	3	14.039	14.424	14.809	15.192	15.574	15.955	16.334	16.713	17.090	17.466
	4	14.077	14.463	14.847	15.230	15.612	15.993	16.372	16.751	17.128	17.504
	5	14.116	14.501	14.885	15.268	15.650	16.031	16.410	16.788	17.166	17.541
	6	14.155	14.540	14.924	15.307	15.688	16.069	16.448	16.826	17.203	17.579
	7	14.193	14.578	14.962	15.345	15.726	16.107	16.486	16.864	17.241	17.616
	8	14.232	14.617	15.000	15.383	15.764	16.145	16.524	16.902	17.278	17.654
	9	14.270	14.655	15.039	15.421	15.803	16.183	16.562	16.939	17.316	17.691

TABLE II - CENTIGRADE SCALE (Continued)

CLASS Q □□□□□□--C DETECTORS (10 OHMS AT 0C)

Temperature vs Resistance Values in Ohms at 1C Intervals

	°C	200	210	220	230	240	250	260	270	280	290
200C	0	17.729	18.103	18.476	18.848	19.219	19.588	19.956	20.323	20.689	21.054
	1	17.766	18.140	18.513	18.885	19.256	19.625	19.993	20.360	20.726	21.091
	2	17.804	18.178	18.551	18.922	19.293	19.662	20.030	20.397	20.762	21.127
	3	17.841	18.215	18.588	18.959	19.330	19.699	20.067	20.433	20.799	21.163
	4	17.879	18.252	18.625	18.996	19.366	19.735	20.103	20.470	20.835	21.200
	5	17.916	18.290	18.662	19.033	19.403	19.772	20.140	20.507	20.872	21.236
	6	17.954	18.327	18.699	19.070	19.440	19.809	20.177	20.543	20.908	21.273
	7	17.991	18.364	18.736	19.107	19.477	19.846	20.213	20.580	20.945	21.309
	8	18.028	18.402	18.774	19.145	19.514	19.883	20.250	20.616	20.981	21.345
	9	18.066	18.439	18.811	19.182	19.551	19.920	20.287	20.653	21.018	21.382
	°C	300	310	320	330	340	350	360	370	380	390
300C	0	21.418	21.780	22.142	22.502	22.861	23.218	23.575	23.930	24.285	24.638
	1	21.454	21.816	22.178	22.538	22.896	23.254	23.611	23.966	24.320	24.673
	2	21.490	21.853	22.214	22.574	22.932	23.290	23.646	24.001	24.355	24.708
	3	21.527	21.889	22.250	22.609	22.968	23.326	23.682	24.037	24.391	24.743
	4	21.563	21.925	22.286	22.645	23.004	23.361	23.717	24.072	24.426	24.779
	5	21.599	21.961	22.322	22.681	23.040	23.397	23.753	24.108	24.461	24.814
	6	21.635	21.997	22.358	22.717	23.075	23.433	23.788	24.143	24.497	24.849
	7	21.672	22.033	22.394	22.753	23.111	23.468	23.824	24.179	24.532	24.884
	8	21.708	22.069	22.430	22.789	23.147	23.504	23.859	24.214	24.567	24.919
	9	21.744	22.106	22.466	22.825	23.183	23.539	23.895	24.249	24.603	24.955
	°C	400	410	420	430	440	450	460	470	480	490
400C	0	24.990	25.340	25.690	26.038	26.386	26.732	27.077	27.420	27.763	28.104
	1	25.025	25.375	25.725	26.073	26.420	26.766	27.111	27.455	27.797	28.138
	2	25.060	25.410	25.760	26.108	26.455	26.801	27.145	27.489	27.831	28.172
	3	25.095	25.445	25.795	26.143	26.490	26.835	27.180	27.523	27.865	28.206
	4	25.130	25.480	25.830	26.177	26.524	26.870	27.214	27.558	27.900	28.241
	5	25.165	25.515	25.864	26.212	26.559	26.904	27.249	27.592	27.934	28.275
	6	25.200	25.550	25.899	26.247	26.593	26.939	27.283	27.626	27.968	28.309
	7	25.235	25.585	25.934	26.282	26.628	26.973	27.317	27.660	28.002	28.343
	8	25.270	25.620	25.969	26.316	26.663	27.008	27.352	27.694	28.036	28.377
	9	25.305	25.655	26.004	26.351	26.697	27.042	27.386	27.729	28.070	28.411
	°C	500	510	520	530	540	550	560	570	580	590
500C	0	28.445	28.784	29.121	29.458	29.794	30.128	30.461	30.793	31.124	31.454
	1	28.478	28.817	29.155	29.492	29.827	30.161	30.494	30.826	31.157	31.487
	2	28.512	28.851	29.189	29.525	29.861	30.195	30.528	30.859	31.190	31.520
	3	28.546	28.885	29.223	29.559	29.894	30.228	30.561	30.893	31.223	31.552
	4	28.580	28.919	29.256	29.592	29.928	30.261	30.594	30.926	31.256	31.585
	5	28.614	28.953	29.290	29.626	29.961	30.295	30.627	30.959	31.289	31.618
	6	28.648	28.986	29.324	29.660	29.994	30.328	30.661	30.992	31.322	31.651
	7	28.682	29.020	29.357	29.693	30.028	30.361	30.694	31.025	31.355	31.684
	8	28.716	29.054	29.391	29.727	30.061	30.395	30.727	31.058	31.388	31.717
	9	28.750	29.088	29.425	29.760	30.095	30.428	30.760	31.091	31.421	31.749
	°C	600	610	620	630	640	650	660	670	680	690
600C	0	31.782	32.110	32.436	32.761	33.085	33.407				
	1	31.815	32.142	32.468	32.793	33.117					
	2	31.848	32.175	32.501	32.826	33.149					
	3	31.881	32.208	32.533	32.858	33.182					
	4	31.913	32.240	32.566	32.890	33.214					
	5	31.946	32.273	32.598	32.923	33.246					
	6	31.979	32.305	32.631	32.955	33.278					
	7	32.012	32.338	32.663	32.988	33.311					
	8	32.044	32.371	32.696	33.020	33.343					
	9	32.077	32.403	32.728	33.052	33.375					

TABLE III - FAHRENHEIT SCALE

CLASS Q □□□□□□--E DETECTORS (90.38 OHMS AT 32F)

Temperature vs Resistance Values in Ohms at 5F Intervals

°F	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
-50	75.64	74.77	73.90	73.05	72.21	71.36	70.54	69.73	68.92	68.12
0	84.50	83.59	82.70	81.81	80.92	80.03	79.15	78.27	77.39	76.52

°F	0	5	10	15	20	25	30	35	40	45
0	84.50	85.40	86.31	87.23	88.15	89.08	90.01	90.95	91.90	92.85
50	93.80	94.78	95.75	96.73	97.71	98.71	99.71	100.71	101.73	102.76
100	103.78	104.81	105.86	106.92	107.97	109.04	110.12	111.20	112.28	113.39
150	114.50	115.60	116.72	117.86	119.00	120.13	121.29	122.45	123.62	124.79
200	125.98	127.18	128.37	129.59	130.81	132.04	133.26	134.52	135.77	137.03
250	138.29	139.58	140.86	142.14	143.45	144.75	146.06	147.38	148.71	150.04
300	151.38	152.72	154.08	155.43	156.79	158.21	159.62	161.04	162.47	163.93
350	165.38	166.84	168.31	169.79	171.28	172.77	174.29	175.82	177.34	178.88
400	180.44	181.99	183.55	185.18	186.80	188.43	190.06	191.71	193.37	195.02
450	196.73	198.45	200.17	201.91	203.70	205.49	207.28	209.10	210.93	212.77
500	214.60	216.52	218.43	220.35	222.27	224.20	226.13	228.06	230.03	232.00
550	233.97	235.95	237.93	239.92	241.91					

TABLE III - CENTIGRADE SCALE

CLASS Q □□□□□□--E DETECTORS (90.38 OHMS AT 0C)

Temperature vs Resistance Values in Ohms at 5C Intervals

°C	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
-50	74.24	72.72	71.19	69.73	68.27					
0	90.38	88.71	87.04	85.41	83.77	82.17	80.56	78.98	77.39	75.82

°C	0	5	10	15	20	25	30	35	40	45
0	90.38	92.09	93.80	95.56	97.31	99.11	100.91	102.76	104.60	106.50
50	108.39	110.34	112.28	114.28	116.27	118.32	120.36	122.46	124.55	126.70
100	128.85	131.06	133.26	135.52	137.78	140.09	142.40	144.76	147.11	149.51
150	151.91	154.35	156.79	159.34	161.89	164.51	167.13	169.80	172.46	175.21
200	177.95	180.75	183.55	186.48	189.40	192.38	195.35	198.45	201.55	204.78
250	208.00	211.30	214.60	218.05	221.50	224.98	228.45	232.00	235.55	239.13
300	242.70									